C21.5: 961/3

Vol. 961 Number 3

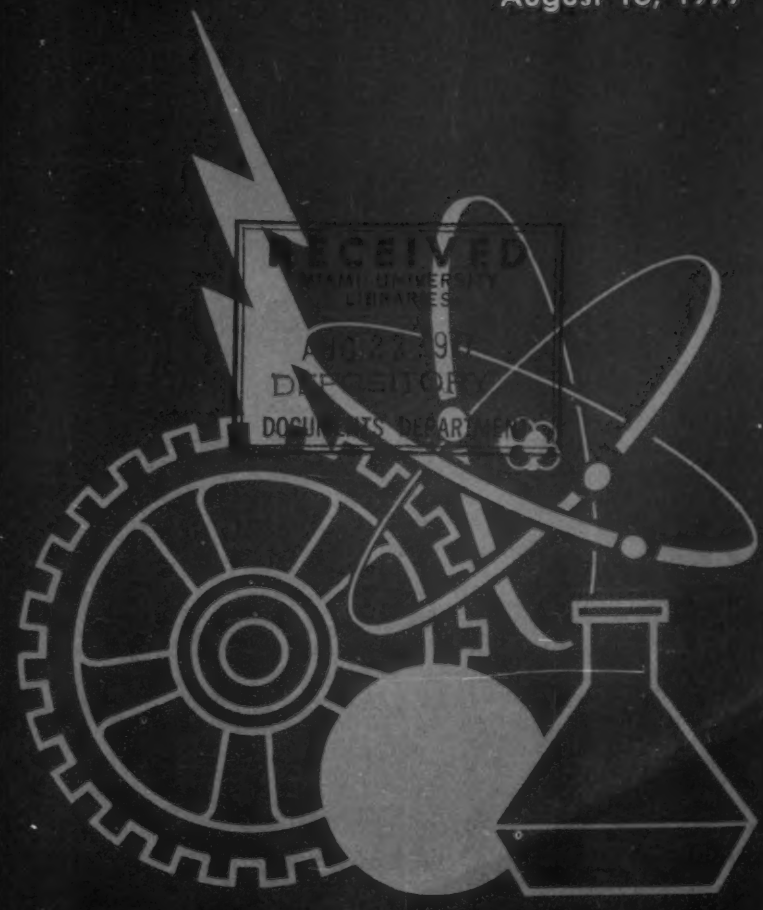
OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

August 16, 1977



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OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

August 16, 1977 Volume 961 Number 3

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PATENT AND TRADEMARK OFFICE NOTICES

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,514,074, Re. S.N. 809,645, Filed June 24, 1977, Cl. 251/127, HIGH ENERGY LOSS FLUID CONTROL, Richard E. Self, Owner of Record: *Inventor,* Attorney or Agent: Benjamin H. Sherman, et al., Ex. Gp.: 341

3,681,179, Re. S.N. 809,629, Filed June 24, 1977, Cl. 428/336, MOISTURE-RESISTANT SOLAR CONTROL FILM, Donald R. Theissen, Owner of Record: *Minnesota Mining and Manufacturing Company, St. Paul, Minn.,* Attorney or Agent: Cruzan Alexander, et al., Ex. Gp.: 164

3,792,531, Re. S.N. 806,992, Filed June 16, 1977, Cl. 32/15, DENTAL RESTORATIVE MATERIAL OF IMPROVED POLISHABILITY, Carl J. Rossi, Owner of Record: *Lee Pharmaceuticals, South El Monte, Calif.,* Attorney or Agent: Edward S. Irons, et al., Ex. Gp.: 333

3,937,882, Re. S.N. 810,583, Filed June 27, 1977, Cl. 178/69.5 R, FULL DUPLEX COMMUNICATION SYSTEM ON A TWO WIRE LINE, John A. C. Bingham, Owner of Record: *The Vadic Corporation, Mountain View, Calif.,* Attorney or Agent: Paul Janicke, et al., Ex. Gp.: 233

3,937,882, Re. S.N. 810,585, Filed June 27, 1977, Cl. 178/69.5 R, FULL DUPLEX COMMUNICATION SYSTEM ON A TWO WIRE LINE, John A. C. Bingham, et al., Owner of Record: *The Vadic Corporation, Mountain View, Calif.,* Attorney or Agent: Paul M. Janicke, et al., Ex. Gp.: 233

3,937,882, Re. S.N. 810,630, Filed June 27, 1977, Cl. 178/69.5 R, FULL DUPLEX COMMUNICATION SYSTEM ON A TWO WIRE LINE, John A. C. Bingham, et al., Owner of Record: *The Vadic Corporation, Mountain View, Calif.,* Attorney or Agent: Paul M. Janicke, et al., Ex. Gp.: 232

3,964,464, Re. S.N. 808,650, Filed June 21, 1977, Cl. 126/270, SOLAR RADIATION COLLECTOR AND CONCENTRATOR, Vernon J. Hockman, Owner of Record: *Oak Ridge Solar Engineering, Inc., Oak Ridge, Tenn.,* Attorney or Agent: William E. Anderson, et al., Ex. Gp.: 344

3,973,399, Re. S.N. 809,564, Filed June 24, 1977, Cl. 60/445, DEMAND COMPENSATED HYDRAULIC SYSTEM WITH PILOT LINE DITHER, Harlan Welbert Van Gerpen, Owner of Record: *Deere & Company, Moline, Ill.,* Attorney or Agent: H. Vincent Harsha, et al., Ex. Gp.: 341

3,990,237, Re. S.N. 809,563, Filed June 24, 1977, Cl. 60/445, DEMAND COMPENSATED HYDRAULIC SYSTEM WITH PRESSURE AMPLIFIER, Harlan Welbert Van Gerpen, Owner of Record: *Deere & Company, Moline, Ill.,* Attorney or Agent: H. Vincent Harsha, et al., Ex. Gp.: 341

4,004,418, Re. S.N. 809,562, Filed June 24, 1977, Cl. 60/422, DEMAND COMPENSATED HYDRAULIC SYSTEM WITH FLOW SENSITIVE DEVICE, Harlan Welbert Van Gerpen, Owner of Record: *Deere & Company, Moline, Ill.,* Attorney or Agent: H. Vincent Harsha, et al., Ex. Gp.: 341

PATENT NOTICES

Certificates of Correction for the Week of Aug. 16, 1977

Re. 29,164	4,001,000	4,018,723	4,024,223
Re. 29,204	4,003,124	4,018,884	4,024,242
Re. 29,207	4,003,302	4,018,931	4,024,439
Re. 29,246	4,003,627	4,019,266	4,024,600
3,686,889	4,003,847	4,019,369	4,024,602
3,704,483	4,003,946	4,019,387	4,024,625
3,741,779	4,004,151	4,019,518	4,024,815
3,760,204	4,005,105	4,019,609	4,024,932
3,767,508	4,005,219	4,019,612	4,024,983
3,796,741	4,005,388	4,019,698	4,025,034
3,882,188	4,006,015	4,020,023	4,025,089
3,897,445	4,006,144	4,020,219	4,025,193
3,900,092	4,007,134	4,020,451	4,025,210
3,917,486	4,008,299	4,020,517	4,025,217
3,919,113	4,008,833	4,020,950	4,025,325
3,932,416	4,009,084	4,021,122	4,025,407
3,940,001	4,009,183	4,021,215	4,025,556
3,947,386	4,009,265	4,021,257	4,025,621
3,951,033	4,009,641	4,021,258	4,025,827
3,962,234	4,010,133	4,021,323	4,025,874
3,962,459	4,012,381	4,021,479	4,025,983
3,966,034	4,012,448	4,021,515	4,026,090
3,966,191	4,012,606	4,021,544	4,026,229
3,966,784	4,012,839	4,021,609	4,026,284
3,973,129	4,013,496	4,021,683	4,026,610
3,974,160	4,013,654	4,021,813	4,026,780
3,974,259	4,013,680	4,022,125	4,026,889
3,976,262	4,014,011	4,022,284	4,026,951
3,978,142	4,014,154	4,022,427	4,026,976
3,978,407	4,014,350	4,022,773	4,027,152
3,980,576	4,014,737	4,023,193	4,027,197
3,981,827	4,014,954	4,023,234	4,027,425
3,982,149	4,015,164	4,023,246	4,027,673
3,984,818	4,015,963	4,023,372	4,027,678
3,986,578	4,015,964	4,023,436	4,028,323
3,988,359	4,016,159	4,023,524	4,028,380
3,990,994	4,016,382	4,023,644	4,028,442
3,993,702	4,016,422	4,023,650	4,028,453
3,994,795	4,016,864	4,023,657	4,028,551
3,997,597	4,016,995	4,023,772	4,028,582
3,998,110	4,017,122	4,023,785	4,029,830
3,998,377	4,017,353	4,023,843	
3,999,821	4,017,610	4,023,889	
4,000,046	4,017,650	4,024,005	

Disclaimers

3,086,528.—*Francis J. Eichelman,* Brookfield, Ill., and *Eldridge H. Smiley,* Los Angeles, Calif. INTERMITTENT VACUUM REGULATOR. Patent dated Apr. 23, 1963. Disclaimer filed June 8, 1977, by the assignee, *Chemetron Corporation.*

Hereby enters this disclaimer to all claims of said patent.

3,810,992.—*Julius Joel Menn,* Saratoga, Calif. ANTHELMINTIC BIS-THIOUREIDO BENZENE DERIVATIVE. Patent dated May 14, 1974. Disclaimer filed Nov. 1, 1976, by the assignee, *Stauffer Chemical Company.*

Hereby enters this disclaimer to claim 1 of said patent.

3,834,143.—*Carlo Menegatto,* Monza, Italy. SPINDLE UNIT FOR TEXTILE MACHINE. Patent dated Sept. 10, 1974. Disclaimer filed June 6, 1977, by the inventor.

Hereby enters this disclaimer to claims 1, 2, 6 and 7 of said patent.

3,888,820.—*Irving Touval,* Fords, and *Morris Dunkel,* Paramus, N.J. NOVEL FLAME RETARDANT COMPOSITIONS OF MATTER. Patent dated June 10, 1975. Disclaimer filed June 16, 1977, by the assignee, *UOP Inc.*

Hereby enters this disclaimer to all claims of said patent.

3,933,692.—*Bernard G. Kushlefsky,* Edison, and *Kenneth Treadwell,* Rahway, N.J. URETHANE FOAM CATALYST. Patent dated Jan. 20, 1976. Disclaimer filed Oct. 26, 1976, by the assignee, *M & T Chemicals Inc.*

Hereby enters this disclaimer to claims 1 through 13, all the claims therein, of said patent.

4,022,905.—*Hans Erik Eriksson,* Holo, and *Gosta Lennart Florvall,* Sodertalje, Sweden. BENZYLIDENE HYDRAZINO - 1,2,4 - TRIAZOLES, PHARMACEUTICALS THEREWITH, AND METHOD OF USE. Patent dated May 10, 1977. Disclaimer filed Feb. 18, 1977, by the assignee, *Astra Lakemedel Aktiebolag.*

The term of this patent subsequent to May 25, 1993 has been disclaimed.

Dedication

3,063,113.—*Theodore Operhall,* Whitehall, and *Emery E. Kuhary,* North Muskegon, Mich. DISPOSABLE PATTERN WITH LOWER MELTING EXTERNAL COATING. Patent dated Nov. 13, 1962. Dedication filed June 3, 1977, by the assignee, *Howmet Corporation.*

Hereby dedicates to the Public the remaining term of said patent.

Errata

All reference to Patent No. 4,031,495 to Brian Crowle of Ashford, England, for DIFFERENTIAL AMPLIFIER appearing in the OFFICIAL GAZETTE of June 21, 1977 should be deleted since no patent was granted.

All reference to Patent No. 4,036,791 to James Leverette Guthrie et al. of Maryland for SIMULATED NATURAL SPONGE FROM URETHANE appearing in the OFFICIAL GAZETTE of July 19, 1977 should be deleted since no patent was granted.

All reference to Patent No. 4,037,012 to Edward Arthur Tilson et al. of England for TRANSFER MATERIALS appearing in the OFFICIAL GAZETTE of July 19, 1977, should be deleted since no patent was granted.

All reference to Patent No. 4,037,131 to Wellman L. Clark et al. of Virginia for RETINA FOR PYROELECTRIC VIDICON appearing in the OFFICIAL GAZETTE of July 19, 1977 should be deleted since no patent was granted.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF JULY 2, 1977

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	8-23-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	9-3-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	6-1-76
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	9-23-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	1-19-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	4-8-76
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	4-28-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	6-14-76
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	1-12-77
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	6-2-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	11-17-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	6-14-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	9-29-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	12-6-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	4-14-70
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	11-24-76

Expiration of patents: The patents within the range of numbers indicated below expire during July 1977, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,943,327 to 2,947,000, inclusive
Plant Patents..... Numbers 1,957 to 1,962, inclusive

REISSUE PATENTS

GRANTED AUGUST 16, 1977

ERRATA

For CLASS	See PATENT NO.
542–417	29,358

REISSUES

AUGUST 16, 1977

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

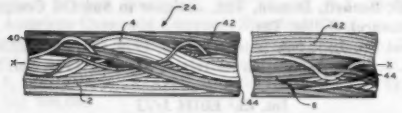
Re. 29,352
NON-TWISTED, HEATHER YARN AND METHOD FOR PRODUCING SAME

Richard C. Newton, Greenville, S.C., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Original No. 3,811,263, dated May 21, 1974, Ser. No. 228,626, Feb. 23, 1972. Application for reissue May 19, 1976, Ser. No. 687,715

Int. Cl.[2] D02G *3/22, 1/16, 1/20*

U.S. Cl. 57—140 R **15 Claims**



1. A yarn having an axis and being formed of a multiplicity of continuous filaments, said filaments forming a plurality of major bundles at least one of which is of substantially different color relative to the remaining bundles, each of said bundles having from about 10 to about 90 percent of its filaments cohering to form a secondary bundle with the remaining filaments of the major bundle varying in number along the length of the yarn, being interlaced with other major bundles of the yarn, and being randomly oriented about the yarn axis, each of said secondary bundles in each unit length of yarn of about 6 inches having a portion thereof formed of greater than about 30 percent of the filaments of its major bundle and each of said secondary bundles in each unit length of yarn of about 8 inches being non-uniformly located relative to the yarn axis.

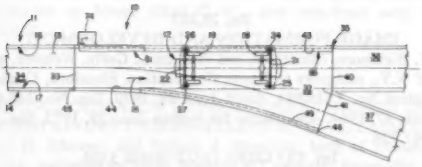
Re. 29,353
SWITCHING SYSTEM FOR A TRANSPORTATION SYSTEM EMPLOYING A GUIDEWAY

John M. Metcalf, Dallas, Tex., assignor to Vought Corporation, Dallas, Tex.

Original No. 3,782,292, dated Jan. 1, 1974, Ser. No. 202,753, Nov. 29, 1971. Application for reissue Dec. 29, 1975, Ser. No. 645,123

Int. Cl.[2] E01B *25/12*

U.S. Cl. 104—130 **30 Claims**



1. In a transportation system of the type employing vehicles adapted to travel along a guideway comprising a roadway and structure providing at least one guide surface, having vertical extension, extending along the guideway for guiding the vehicle, the system including a pluraity of guideway junctions, each junction having a first end communicating with a first portion of the guideway and a widened, bifurcated, second end communicating with second and third, mutually diverging portions of the guideway, the transportation system including at least one primary guideway and at least one secondary guideway, having inlet and outlet ends, connected to the primary guideway by respective, oppositely directioned switching systems, the transportation system further including programmable control means for sensing the positions of the respective vehicles and for automatically actuating respective ones of the switching systems at appropriate times in response to the movement of the respective vehicles and according to respective, preselected routes programmed in the control system with respect to each vehicle, an improved switching system adapted for use in such a transportation system, the switching system comprising:

a single movable guide rail positioned adjacent the first end of the junction and pivotable about an approximately vertical axis between first and second positions;

first guiding means, comprising a first guide surface on the movable guide rail, for guiding a vehicle toward the second guideway portion upon the vehicle entering the junction from the junction first end when the movable guide rail is in its first position; [and]

second guiding means, comprising a second guide surface on the movable guide rail, for guiding a vehicle toward the third guideway portion upon the vehicle entering the junction from the junction first end when the movable guide rail is in its second position,

third guiding means[, immovably positioned between the movable guide rail and the second guideway portion,] for guiding a vehicle through the junction and onto the second guideway portion upon the vehicle being initially guided by the first guiding means and comprising a guide surface defined by a structure *immovably positioned between the movable guide rail and the second guideway portion;* and

fourth guiding means[, immovably positioned between the first end of the junction and the third guideway portion,] for guiding a vehicle through the junction and onto the third guideway portion upon the vehicle being initially guided by the second guiding means, *the fourth guiding means comprising a guide surface defined by a structure immovably positioned between the first end of the junction and the third guideway portion, the movable guide rail being spaced laterally, relative to the junction, from the guide surface of the fourth guiding means, the movable guide rail having a first end adjacent the junction first end and a second end adjacent the guide surface of the third guiding means and between the structure of the third guiding means and the junction first end, the first and second guide surfaces extending along the movable guide rail to a location thereon adjacent the movable guide rail second end, the portions of the first and second guide surfaces adjacent the movable guide rail second end being intermediate the respective guide surfaces of the third and fourth guiding means upon the movable guide rail being in its second position.*

Re. 29,354
ELECTRIC NAILER

Bruce Malkin, Norwalk, Conn., assignor to Electro-Speed Tool Corporation, Norwalk, Conn.

Original No. 3,810,572, dated May 14, 1974, Ser. No. 307,415, Nov. 17, 1972. Application for reissue May 13, 1976, Ser. No. 686,322

Int. Cl.[2] B25C *1/06*

U.S. Cl. 227—132 **15 Claims**

12. An electrically operable portable hammer device comprising, in combination:

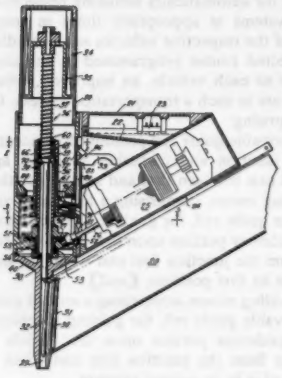
elongated axially movable hammer means;

energy storage means connected to said hammer means for delivering operating force to said hammer means;

an electrical motor, and a charging mechanism for coupling said electrical motor to said energy storage means to enable charging of said energy storage means to a predetermined

charged condition, said charging mechanism including a rotating sleeve having a plurality of charging balls trapped therein, and

wherein said elongated hammer means includes a threaded region engageable by said charging balls, whereby rotation of said sleeve causes said balls to drive said hammer means to



change the energy storage means to said predetermined charged condition;

latch means for latching said energy storage means in said predetermined position; and

trigger means for defeating said latch means to permit said energy storage means to operate said hammer means.

Re. 29,355

BOARD GAME APPARATUS

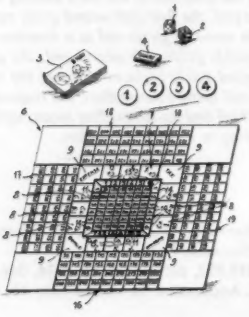
Andre Lefevre, and Rosemary Loweth Lefevre, both of 4 rue Albert Malet, 75012 Paris, France

Original No. 3,799,552, dated Mar. 26, 1974, Ser. No. 250,360, May 4, 1972. Application for reissue Mar. 26, 1976, Ser. No. 670,708

Claims priority, application France, May 5, 1971, 71.16188

Int. Cl.[2] A63F *3/00*

U.S. Cl. 273—134 AF **12 Claims**



9. A parlor game adapted to be played with tokens representing the different players, and with simulated currency, said game comprising:

a game board including

a first portion subdivided into discrete areas containing numerical indicia arranged in rows and columns,

a second portion subdivided into two sets of areas, the areas of one set being aligned with respective ones of the rows, and the areas of the other set with respective ones of the columns of the first portion, the areas of each set having distinctively different indicia denoting the different rows or columns with which they are aligned,

a third portion defining a track for movement of the tokens and divided into segments, at least some of the segments having indicia thereon designating objects available for purchase with the simulated currency, there being a plurality of different objects, the objects being cards bearing indicia corresponding to the indicia on the track; and

means operable by the players to select on the basis of chance specific ones of the indicia in the two sets of areas in the second portions, and to determine the movement of the tokens along the track.

Re. 29,356

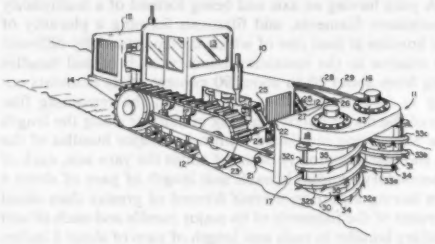
SYSTEM FOR CHIPPING AND MOVING ICE

John D. Bennett, Denton, Tex., assignor to Sun Oil Company (Delaware), Dallas, Tex.

Original No. 3,888,544, dated June 10, 1975, Ser. No. 420,815, Dec. 3, 1973. Application for reissue Sept. 20, 1976, Ser. No. 724,877

Int. Cl.[2] E01H *5/12*

U.S. Cl. 299—25 **11 Claims**



1. A system for chipping ice and forming a pathway through rough, icy terrain, comprising: a pair of cylindrical drums mounted for rotation about parallel vertical axes, each of said drums including a smooth, outwardly rounded lower end surface to support the weight of the drum; a plurality of spikes protruding outwardly from the cylindrical outside surface of each drum to engage and chip the ice, the circular paths formed by the tops of the spikes when the drums are rotated being overlapping in the [regioon] *region* between the drums; and means for rotating said drums in opposite directions to chip ice and pull the drums forwardly through the ice to form a pathway along a generally level grade.

Re. 29,357

IMAGE FORMATION AND DEVELOPMENT

J. T. Bickmore, Rochester, and William L. Goffe, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Original No. 3,518,081, dated June 30, 1970, Ser. No. 345,433, Feb. 17, 1964. Application for reissue June 29, 1972, Ser. No. 267,724

Int. Cl.[2] G03G *13/22*; B05D *3/06*

U.S. Cl. 96—1 R **12 Claims**

5. The method of forming a latent electrostatic image on an imaging layer comprising increasing the molecular weight of at least a surface of said layer by subjecting it to a polymerizing influence in imagewise configuration thereby modifying the triboelectric charging susceptibility of said surface in imagewise configuration and bringing said surface into frictional contact with a material remote in the triboelectric series from at least one of the modified and the unmodified portions of said surface so that a differential charge pattern is set up between image and non-image areas on said surface *as a consequence of said imagewise change in triboelectric susceptibility and said contact.*

13. The method of forming a latent electrostatic image on an imaging layer comprising modifying the triboelectric charging susceptibility of a surface of said layer in imagewise configuration by means of imagewise contaminating said surface with human body oils and bringing said imaging surface into contact with a material remote in the triboelectric series from at least one of the modified and the unmodified portions of said imaging surface so that a differential charge pattern is set up between image and non-image areas on said imaging surface as a consequence of said imagewise change in triboelectric susceptibility and said contact.

Re. 29,358

1,5-BIS SUBSTITUTED-1,4-PENTADIEN-3-ONE SUBSTITUTED AMIDINO HYDRAZONE SALTS AND METHOD OF PREPARING THE SAME

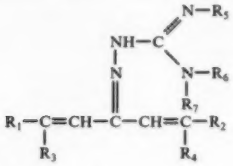
Andrew Stephen Tomcufcik, Old Tappan, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Original No. 3,878,201, dated Apr. 15, 1975, Ser. No. 337,033, Mar. 1, 1973. Continuation-in-part of Ser. No. 131,412, April 5, 1971, abandoned. Application for reissue July 16, 1976, Ser. No. 706,085

Int. Cl.[2] **C07C** *133/10;* **C09B** *23/00*

U.S. Cl. 542—417 **15 Claims**

1. A pentadiene of the formula:



wherein R_1 and R_2 may be the same or different and are selected from the group consisting of phenyl, halophenyl, carboxyphenyl, lower alkoxy (C_1–C_4)phenyl, diloweralkoxy (C_1–C_4)phenyl, biphenylyl, alkyl (C_1–C_4) phenyl, dialkyl (C_2–C_8)phenyl, nitrophenyl, trifluoromethylphenyl, lower alkyl (C_1-C_4)sulfonylphenyl, lower alkyl (C_1–C_4)thiophenyl, methylenedioxyphenyl, cyanophenyl, sulfamylphenyl, carboloweralkoxy (C_1–C_4)phenyl, naphthyl, lower alkoxy (C_1–C_4) naphthyl and halonaphthyl, R_3 and R_4 may be the same or different and are selected from the group consisting of hydrogen, lower alkyl C_1–C_4, phenyl and halophenyl; R_5 and R_6 are lower alkyl C_1–C_4 and when taken together an alkylene group of 2 to 9 carbon atoms, a methyl or a phenyl alkylene group of 2 to 4 carbon atoms, a dimethyl or a diphenyl alkylene group of 2 to 4 carbon atoms, *or a 1,2-cyclohexylene group,* and R_7 is hydrogen or lower alkyl C_1–C_4, and non-toxic acid salts thereof.

Re. 29,359

BRONCHODILATOR EXPECTORANT COMPOSITION CONTAINING THEOPHYLLINE AND A GUAIACOL

Neil H. Mercer, and Robert J. Bequette, both of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.

Original No. 3,109,773, dated Nov. 5, 1963, Ser. No. 147,436, Oct. 25, 1961. Application for reissue July 28, 1976, Ser. No. 709,569

Int. Cl.[2] **A61K** *31/52, 31/09*

U.S. Cl. 424—253 **12 Claims**

1. A pharmaceutical composition comprised of at least about 40% by volume of water having dissolved therein at room temperature more than 0.83 g. of theophylline per 100 ml. of water contained therein, and a solubilizing agent selected from the group consisting of guaiacol and pharmaceutically acceptable water soluble forms thereof in amount sufficient to maintain said theophylline in solution [.] . *wherein a greater amount of theophylline is dissolved at room temperature than the amount thereof which is soluble in the composition in the absence of said solubilizing agent, and wherein the greater amount of theophylline dissolved is made possible by the solubilizing agent.*

Re. 29,360

SYSTEM FOR RECORDING AND/OR REPRODUCING FOUR CHANNEL SIGNALS ON A RECORD DISC

Nobuaki Takahashi, Yamato, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Japan

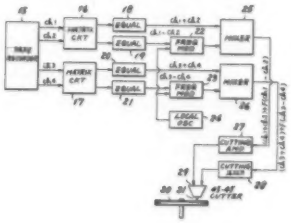
Original No. 3,883,699, dated May 13, 1975, Ser. No. 261,914, June 12, 1972. Continuation of Ser. No. 92,803, Nov. 25, 1970, Pat. No. 3,686,471. Application for reissue Sept. 7, 1976, Ser. No. 720,762

Claims priority, application Japan, Nov. 28, 1969, 44-95587; Mar. 15, 1970, 45-21826; Mar. 24, 1970, 45-24579; July 5, 1970, 45-58313

The portion of the term of this patent subsequent to Aug. 22, 1989, has been disclaimed.

Int. Cl.[2] **G11B** *3/00, 3/74;* **H04B** *5/00*

U.S. Cl. 179—100.4 ST **26 Claims**



1. A system for recording four channel signals in a single groove cut on a record disc, said system comprising signal source means for supplying four separate channel signals, matrix circuit means for composing a first sum signal and a first difference signal responsive to the first and second channel signals and also a second sum signal and a second difference signal responsive to the third and fourth channel signals of the four separate channel signals, single oscillator means for generating a carrier wave having a predetermined frequency, first modulator means for angle modulating said carrier wave with the first difference signal, second modulator means for angle modulating said carrier wave with the second difference signal, each of said modulator means comprising means whereby the phase angle deviation of said carrier wave is between 0.3 and 3 radians *for at least those frequencies which are higher than a predetermined frequency when the level of each of said difference signals applied respectively to said two modulator means is a standard level,* the lower frequency limit of the carrier wave in the output of each of said modulator means being higher than the upper frequency limit of the first and second sum signals, first mixer means for mixing and multiplexing the first sum signal with the output signal of the first modulator means, second mixer means for mixing and multiplexing the second sum signal with the output signal of the second modulator means, and means for simultaneously recording the output signal of said first mixer means on one wall of a single groove of the record disc and recording the output signal of said second mixer means on the other wall of the groove.

Re. 29,361

PROCESS FOR SHAPING WORKPIECE BY ELECTRICAL DISCHARGE AND APPARATUS THEREFOR

Nagao Saito; Kazuhiko Kobayashi, both of Nagoya, and Shigeru Takagi, Kasugai, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Original No. 3,705,287, dated Dec. 5, 1972, Ser. No. 132,519, Apr. 8, 1971. Application for reissue July 28, 1975, Ser. No. 599,392

Claims priority, application Japan, June 2, 1970, 45-47389

Int. Cl.[2] B23P *1/08*

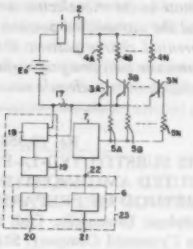
U.S. Cl. 219—69 C **6 Claims**

1. A process for shaping a workpiece using electric current comprising the steps of:

positioning a workpiece adjacent a working electrode such that the electrode and the workpiece are separated by a working gap,

impressing an intermittent pulse voltage across said working gap, *said intermittent pulse voltage comprising a repeating no-load voltage followed by a discharge voltage at the commencement of which a substantial current begins to flow within said working gap followed by a quiescent period during which no voltage is present in the gap,*

detecting the *no-load* time period between the instant at which a *no-load* voltage is impressed across said working gap and the instant at which a substantial current begins to flow within said working gap; and,



controlling the length of time during which said substantial current flows directly in response to the length of said *no-load* detected time period *and independently of the length of the quiescent period.*

PLANT PATENTS

GRANTED AUGUST 16, 1977

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,091

MINIATURE ROSE PLANT

Ernest D. Williams, Dallas, Tex., assignor to Ralph S. Moore, Visalia, Calif., a part interest

Filed Sept. 17, 1976, Ser. No. 725,081
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—7 **1 Claim**

1. A new and distinct variety of miniature rose plant of hardy, dwarf, bushy, upright, much branched habit, essentially as illustrated and described, characterized by buds and flowers of a bright red-orange to orange-pink color resembling the Mary Marshall miniature rose (U.S. Plant Pat. No. 3,346), the buds and flowers being slightly smaller in size than Mary Marshall; and further characterized by a plant which is vigorous and compact, said plant being easy to propagate from cuttings, with medium small, disease resistant, mat foliage, an abundance of bloom, with better than average keeping quality, with flowers borne singly or several to the stem in loose clusters.

4,092

CHRYSANTHEMUM PLANT NAMED COPPER HOSTESS

Robert E. Danielson, West Chicago, Ill., assignor to Pan American Plant Company, West Chicago, Ill.

Filed Oct. 12, 1976, Ser. No. 731,743
Int. Cl.[2] A01H *5/00*
U.S. Cl. Plt.—79 **1 Claim**

1. A new and distinct variety of chrysanthemum plant, substantially as herein shown and described, characterized particularly, when compared to its parent "Hostess", by its unique orange-bronze coloration, less longitudinal petal roll and less reflexing of the outer ray florets, and by its larger flower size.

PATENTS

GRANTED AUGUST 16, 1977

ERRATA

For CLASS	See PATENT NO.
072–410	4,041,740
072–389	4,041,765
072–402	4,041,766
074–751	4,041,835
173–013	4,042,036
173–152	4,042,043
211–049 D	4,042,095
211–049 D	4,042,096
211–182	4,042,097
126–121	4,042,160
251–044	4,042,178
269–088	4,042,264
431–004	4,042,313
428–678	4,042,341
428–585	4,042,342
428–667	4,042,426
209–074 R	4,042,491
106–288 Q	4,042,582
542–458	4,042,583
544–059	4,042,584
544–022	4,042,585
544–060	4,042,586
544–183	4,042,587
544–183	4,042,588
548–339	4,042,597
428–447	4,042,643
128–034	4,042,736
361–490	4,042,861
363–037	4,042,870
363–028	4,042,871
363–020	4,042,872
363–129	4,042,873
364–900	4,042,911
364–200	4,042,912
364–200	4,042,913
364–200	4,042,914
254–139.1	4,042,941
235–150.3	4,042,973

PATENTS

GRANTED AUGUST 16, 1977

GENERAL AND MECHANICAL

4,041,549
POCKETED GARMENT
Paul Ray Atkinson, 1624-A Hayden, Amarillo, Tex. 79102
Filed May 21, 1976, Ser. No. 688,790
Int. Cl.[2] A41D *1/04*
U.S. Cl. 2—94 **8 Claims**

1. A body contour fitting garment for human wear with detachable pockets comprising;

a. a vertically and horizontally extending flexible back panel with a side and a top edge,

b. a vertically and horizontally extending front flexible body fitting panel with a side edge and a top edge, said front and back panels joined at said top edges and said side edges of said panels, said front body fitting panel having a curved contour which matches an adjacent three dimensionally extending curved body contour of a wearer of said garment,

c. a vertically and horizontally extending detachable pocket comprising a front wall and a flexible rear wall joined together,

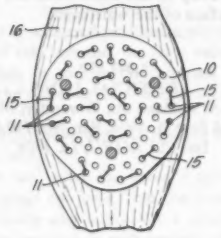
d. a horizontally evenly distributed array of a vertically extending evenly distributed series of outwardly curved loops the ends each of which are attached to and extend outward from a surface of a separately flexible loop supporting panel firmly yet flexibly attached to said front body fitting panel and having the same curved contour and said loops are substantially uniformly spaced apart along each of the two different planes perpendicular to each other over said surface of the separately flexible loop supporting panel and said array of loops has an outer surface that is free of palpable protuberances; and

e. a horizontally evenly distributed array of vertically extending evenly distributed series of resilient hook members attached to and extending outwardly from a surface of a hook supporting separately flexible panel firmly yet flexibly attached to said rear wall of said pocket and said hooks are substantially uniformly spaced apart along each of two planes perpendicular to each other over said surface of said hook support panel and the spacing of said hook members along said mutually perpendicular planes on the hook support panel is different from the spacing of the loops on the loop support panel along mutually perpendicular planes,

f. and the loop supporting panel is joined to said hook supporting panel by a series of non-parallel spaced apart resilient tension bearing combinations of said hook members and said loops in mechanical engagement with each other, and

g. adjacent said tension bearing combinations intermediate resilient compression members are compressed between said hook bearing panel and said loop bearing and, adjacent said tension bearing combinations, portions of said pile and hook support panels are resiliently pressed apart between neighboring members of said series of tension bearing combinations of mechanically joined hook members and loops by said resiliently compressed members and substantially all portions of the surfaces of the loop supporting panel and neighboring portions of the hook supporting panel so joined are firmly located equidistant from each other whereby said separately flexible loop bearing panel and said separately flexible hook bearing panels are firmly held spaced apart in a resulting three dimensionally stable stiffened structure having the curved contour of said curved loop support panel.

4,041,550
ARTIFICIAL PATELLA AND METHOD OF REPAIRING A NATURAL PATELLA
Calvin H. Frazier, 1808 Verdugo Blvd., Glendale, Calif. 91208
Filed July 30, 1976, Ser. No. 710,360
Int. Cl.[2] A61F *1/24*
U.S. Cl. 3—1.91 **10 Claims**



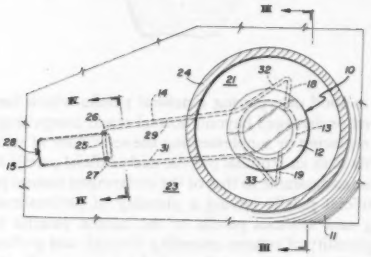
1. A method of repairing a natural patella which has been destroyed or damaged beyond normal repair comprising completely replacing or supplementing the remainder of said natural patella with an artificial patella, said artificial patella having a contour comparable to that of the undamaged natural patella, said artificial patella having a plurality of perforations, and suturing said artificial patella to the natural patellar tendon with a plurality of sutures extending through said perforations in said artificial patella and through the natural patellar tendon to securely attach said artificial patella in a position comparable to that of the natural patella, said artificial patella being adapted to function in a manner comparable to that of the natural patella.

4,041,551
WAISTBAND
Morris Cohen, 9250 Meilleur, Montreal, Quebec, Canada (H2N 2B2)
Filed Aug. 12, 1976, Ser. No. 713,988
Int. Cl.[2] A41F *9/00*
U.S. Cl. 2—236 **14 Claims**

1. A waistband, comprising
an outer band,

a stiffening insert on the inner surface of said outer band, said outer band having an upper and a lower edge portions folded over the edges of said stiffening insert,
an anti-slip band on said stiffening insert,
a first lining with a first stiffening insert sewed to said lower folded over edge portion of said outer band by means of a first row of stitches,
a second lining with a second stiffening insert positioned partly on said first lining and partly on said anti-slip band, said second lining being sewed by said first row of stitches to said outer band and by a second row of stitches stitch passing through said anti-slip band to said outer band,
a third lining with a third stiffening insert positioned partly on said upper folded over edge portion of said outer band and partly on said anti-slip band, said third lining being sewed by a third row of stitches passing through said anti-slip band to said outer band and by a fourth row of stitches to said upper folded over edge portion of said outer band,
said first, second, third and fourth row of stitches extending through the body of said outer band and being visible on the outer surface of the waistband.

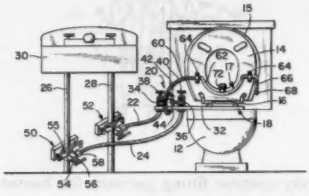
4,041,552
ARTIFICIAL LENS
Fotios Ganias, 4 N. Ashland St., Worcester, Mass. 01609
Filed Sept. 1, 1976, Ser. No. 719,672
Int. Cl.[2] A61F *1/16, 1/24*
U.S. Cl. 3—13 **9 Claims**



1. Artificial lens for application to the eye after the natural lens has been removed, comprising
a. a lens element adapted to lie adjacent the iris, and
b. a support arm connected at one end to the lens element and extending generally radially thereof, the other end of the arm having means for suturing it to the ciliary body and sclera at two substantially-spaced points equidistant from the center of the iris to prevent tipping of the lens element, the support arm being a loop of wire whose ends are connected to the lens element, the loop being generally U-shaped with the lens element located at the open end and the suture points located at two remote corners.

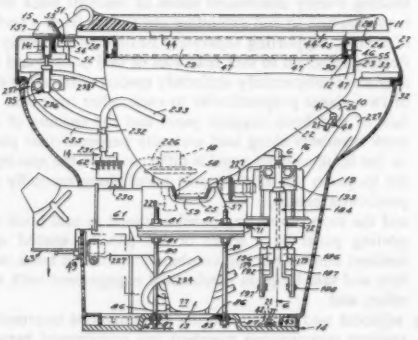
4,041,553
HYGIENIC JET
Sy Sussman, 740 Princeton Road, Franklin Square, N.Y. 11010
Continuation-in-part of Ser. No. 451,885, March 18, 1974, abandoned. This application Aug. 11, 1975, Ser. No. 603,510
Int. Cl.[2] A47K *3/22, 11/08*
U.S. Cl. 4—7 **1 Claim**

1. A douching attachment for a toilet bowl having a hinged toilet seat including bolts for mounting the seat upon the toilet bowl comprising:
a. a mounting bracket containing bolt holes appropriately spaced for mounting upon the toilet seat bolts;
b. first and second valve means, each having an input port for connection to a water source and an output port mounted on said bracket;
c. Tee means interconnecting the output ports of said first and second valve means to provide a single unitary output port;
d. a tube having a pair of spaced colinear sections joined by an arcuate tube section and a right angle closed terminal section extending from one of the colinear sections and a flexible tube joining the end of the other of the colinear sections;
e. journal members for rotatably securing the colinear sections to the underside of the toilet seat for movement in a plurality of positions from a retracted position under a rear portion of said seat to a forward position adjacent to the front of said seat; and



f. a nozzle extending from the middle of the said arcuate section and in communication with the interior therewith, said nozzle being oriented to direct a stream of water at an angle of about 18° below the axis of rotation of said tube and tangential to a circle coaxial with the axis of rotation of the tube, said tube being closed at one end and having means for connection at its other end to a source of water, the curvature of said tube being such that it may be retracted completely beneath said rear portion of the seat and in the retracted position the stream is directed within the bowl.

4,041,554
VACUUM FLUSH WATER CLOSET
Charles E. Gregory, Anchorville; Michael Brian, Orchard Lake; Jerald F. Thomas, Utica, and James F. Cameron, Milford, all of Mich., assignors to Jered Industries, Inc., Birmingham, Mich.
Filed Jan. 22, 1974, Ser. No. 435,511
Int. Cl.[2] B63B *29/14;* **E03D** *5/012*
U.S. Cl. 4—10 **26 Claims**

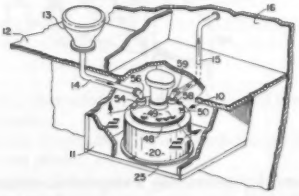


1. In a vacuum flush water closet, the combination, comprising:
a. a sewage discharge valve that is operated by vacuum;
b. means for producing a vacuum;
c. a bowl having an outlet neck at the lower end thereof which is seated on and solely supported by said vacuum operated sewage discharge valve;

d. support means for supporting said vacuum operated sewage discharge valve;
e. said bowl having an open upper end with a rim thereabout;
f. a seat mounted on said rim;
g. a vacuum operated flushing water supply means carried by said bowl for supplying a predetermined amount of flushing water into said bowl; and,
h. a vacuum operated control system carried by said bowl for selectively activating said vacuum operated sewage discharge valve and said vacuum operated flushing water supply means for a predetermined flushing cycle.

21. A vacuum control system including a vacuum operated sewage system having a vacuum flush water closet, a means for producing a vacuum, a flushing water flow control valve that is operated by vacuum, and a sewage discharge valve that is operated by vacuum, the combination comprising:
a. a vacuum operated vacuum control valve connected to said means for producing a vacuum and to said vacuum operated sewage discharge valve for selectively supplying vacuum to said vacuum operated sewage discharge valve;
b. timer means operated by vacuum and gravity for operating said vacuum operated flushing water flow control valve and said vacuum operated vacuum control valve; and,
c. push button activation switch connected to said means for producing a vacuum and said timer for initiating a flushing cycle in said water closet.

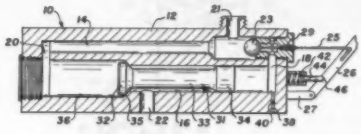
4,041,555
MARINE HOLDING TANK
David F. Cole, 99 Elmridge Road, Mansfield, Ohio 44907, and Walter Sutcliffe, Kinnelon (Smoke Rise), N.J. 07405
Continuation-in-part of Ser. No. 173,096, Aug. 19, 1971, abandoned. This application Nov. 5, 1973, Ser. No. 412,747
Int. Cl.[2] E03D *1/00, 3/00, 5/00*
U.S. Cl. 4—10 **13 Claims**



1. A holding tank in fluid communication with a toilet comprising a housing having intake port and exhaust port means, a basket mounted in said housing for receiving an excrement and water charge from the toilet through the intake port, rotary mixing means in said basket for mixing the excrement with the water, and heating means for said charge operated simultaneously with said mixing means, whereby said charge is reduced in the basket to a liquid-solid mixture and then to vapor and ashes for removal of the vapor and the ashes from the housing through the exhaust port means.

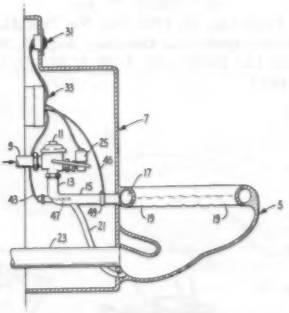
4,041,556
FLUSHING METHOD AND APPARATUS
Stanley N. Darling, and Reyi Darling, both of 1248 Craigflower Road, Victoria, British Columbia, Canada (V9A 2Y6)
Filed Mar. 31, 1976, Ser. No. 672,152
Claims priority, application Canada, Apr. 9, 1975, 224379
Int. Cl.[2] E03D *1/34*
U.S. Cl. 4—52 **23 Claims**

1. Flush valve apparatus comprising:
a valve body;
a channel formed in said body,
an inlet in communication with the channel near one end thereof,
an outlet in communication with the channel and spaced from said one end,
a flow valve in channel having a head, a stem of smaller cross section than the head and a guide portion that is a close, slidable fit in the channel and remote from the head,
a valve seat in the channel between said one end and the outlet,
said valve being reciprocal in the channel between a closed, rest position in which the valve head is located on the



valve seat to a second position in which the head is in the vicinity of said one end, the flow valve being adapted to ensure that, in use, liquid can pass the head and out through the outlet at all positions except the closed position, and
means to permit movement of the valve to move the head off the valve seat,
whereby, in use, when the valve is moved to said second position liquid can pass from the inlet to the outlet and simultaneously move the valve gradually back to the closed, rest position to stop passage of liquid through the outlet.

4,041,557
TOILET FLUSHING DEVICE WITH OVERFLOW INHIBITOR
Robin L. Ringler, San Francisco, Calif., assignor to Aluminum Plumbing Fixture Corporation, Burlingame, Calif.
Filed Sept. 29, 1976, Ser. No. 727,777
Int. Cl.[2] E03D *11/02, 11/18*
U.S. Cl. 4—75 **3 Claims**



1. A toilet having an electrical flushing mechanism including an overflow inhibiting circuit, comprising in combination:
a. a toilet bowl having a water supply pipe leading thereto;
b. an electrically-actuated flushing valve for supplying flushing water through said supply pipe from a source of water supply;
c. an electric supply including a momentary contact switch for actuating said flushing valve;
d. an insulated electrode mounted in said water supply pipe;
e. said electrode leading to a detection circuit and means whereby said detection circuit deactivates said electric

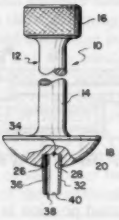
supply when water is in said supply pipe and completes the circuit between said electrode and ground.

4,041,558

SHEETROCK HOLE PUNCHER AND NAIL SETTER

Harvey Victor, 24 Back Drive, Edison, N.J. 08817

Filed May 10, 1976, Ser. No. 684,666
Int. Cl.[2] B25C *3/00*; B26F *1/32*
U.S. Cl. 7—14.1 R **3 Claims**



1. A sheetrock nail setter comprising in combination:

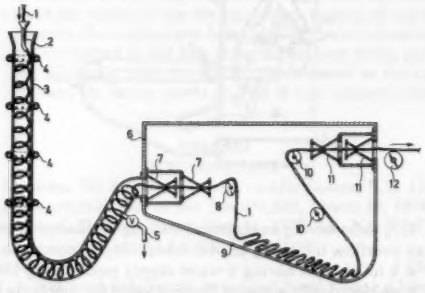
an impact tool including an elongated shank having an enlarged head at one end thereof adapted to receive impact blows delivered thereto, the other end of said shank having a cutting tool-receiving nail set head, the central portion of the lower surface of said nail set head being provided with a recess therein, the base of said recess being located sufficiently close to the lower surface of said nail set head as to be cooperable with a nail head to drive same into the sheetrock in countersunk relation therewith, said nail set head being dished upwardly from said central portion thereof to a level above the base of said recess and thus cooperable with said base to permit countersinking of the nail.

4,041,559

PROCESS FOR THE CONTINUOUS WET TREATMENT OF TEXTILE MATERIAL IN ROPE FORM

Hans-Ulrich von der Eltz, Frankfurt am Main, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 20, 1976, Ser. No. 716,241
Claims priority, application Germany, Aug. 23, 1973, 2537615
Int. Cl.[2] D06B *3/26, 3/28, 21/00, 23/18*
U.S. Cl. 8—149.1 **1 Claim**



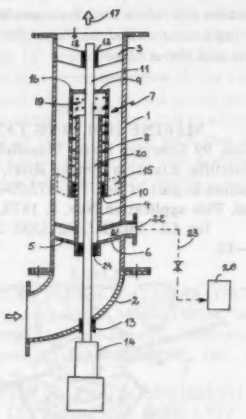
1. A continouos process for the wet treatment of textile material in the form of endless ropes and for dwelling the textile a certain period under high temperature (HT) conditions, which comprises introducing the material in curls into the long leg of a vertically positioned, U-shaped tubular tunnel having legs of different length, impregnating the textile under atmospheric pressure with hot treatment liquor that is ejected at a high flow rate by means of spraying nozzles which are positioned at the top and at additional locations further down the descending long leg of the tubular tunnel, conveying the textile along the bent portion of the tubular tunnel under the hydrostatic pressure exerted on the material by the weight of the liquid column in the long leg, conveying the textile from the short leg of the tubular tunnel into a pressure-tight reaction and fixing chamber through at least two pressure locks placed one behind the other at the entrance of the reaction and fixing chamber, allowing the textile to dwell during its passage through the reaction and fixing chamber under the action of a HT vapor atmosphere in stored condition, and finally withdrawing the textile from the reaction and fixing chamber through at least two other pressure locks.

4,041,560

METHOD AND DEVICE FOR DEWATERING OF SUSPENSIONS IN MOVEMENT

Finn Jacobsen, Karlstad, Sweden, assignor to Kamry AB, Karlstad, Sweden

Filed Apr. 13, 1976, Ser. No. 676,660
Claims priority, application Sweden, Apr. 15, 1975, 7504309
Int. Cl.[2] B01D *33/00*; D21C *9/18*; D21D *5/22*
U.S. Cl. 8—156 **17 Claims**



1. Apparatus for dewatering a suspension comprising

a generally cylindrical container through which suspension to be dewatered flows in a first direction, said container having an axis extending generally parallel to said first direction,

screen means for removal of a portion of the liquid from the suspension flowing through said container, said screen means extending generally along the axis of said container in which it is disposed and defining an interior variable volume chamber, the interior volume of said cylindrical container including said screen means remaining constant but the interior volume of said screen means interior chamber being variable within said container volume,

mechanical means for reciprocating a portion of said screen means in said first direction and in a second direction opposite to said first direction so that the volume of said interior chamber of said screen means is varied by said reciprocation, and

means connected to the interior chamber of said screen means for expelling liquid separated from said suspension to an area remote from said container.

12. A method of dewatering a suspension of comminuted fiber material and liquid utilizing a mechanically reciprocal screen means extending along the axis of a generally cylindrical container in which it is disposed and through which suspension to be dewatered flows, the screen means defining a vari-

able volume interior chamber, the interior volume of said cylindrical container including said screen means remaining constant but the interior volume of said screen means interior chamber being variable within said container volume, comprising the steps of

a. establishing a flow of suspension of comminuted fiber material and liquid in a first direction in the container,

b. mechanically moving a portion of the screen means in said first direction at about the speed of flow of suspension in said first direction so that liquid to be removed from the suspension flows through the screen means into the interior chamber thereof,

c. removing the separated liquid from the container to an area remote from the container, and

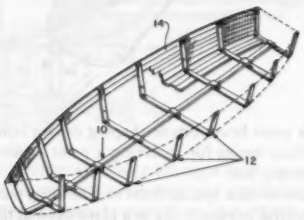
d. mechanically moving the portion of the screen means in a second direction opposite to the first direction to decrease the volume of the interior chamber of the screen means while continuously effecting removal of the separated liquid from the interior chamber.

4,041,561

FIBER-REINFORCED PLASTIC UNITIZED BOAT HULL FRAME

Richard V. Humphrey, 10 Loving Ave., Kingston, Mass. 02364

Continuation of Ser. No. 599,848, July 28, 1975, abandoned.
This application Nov. 12, 1976, Ser. No. 741,373
Int. Cl.[2] B63B *5/24*
U.S. Cl. 9—6 P **10 Claims**



1. A unitary fiber-reinforced plastic boat hull frame comprising in combination:

a. at least one longitudinal frame member consisting of fiber-reinforced plastic; and

b. a plurality of individual and separate transverse frame members positioned transverse said longitudinal frame member, at least one transverse member extending as an integral member from one side of the longitudinal member to the other, said transverse frame members consisting of fiber-reinforced plastic, said transverse and longitudinal frame members arranged to overlap one another, said longitudinal and said transverse frame members attached to each other at the overlap interface of said members.

4,041,562

SURFBOARD LEASH

Robert B. Nealy, 129 Ladera Lane, San Clemente, Calif. 92672

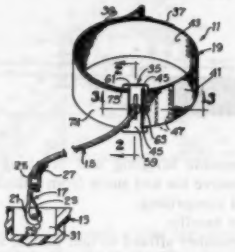
Filed Apr. 23, 1976, Ser. No. 679,731
Int. Cl.[2] A63C *15/06*
U.S. Cl. 9—310 AA **7 Claims**

1. A surfboard leash comprising:

an ankle attachment including a flexible strap adapted to be wrapped around the ankle of the user, said strap having first and second ends and first and second generally opposite faces;

said ankle attachment including a buckle having at least one opening extending therethrough and means for connecting the buckle to the strap at a location along said strap which is spaced from said first end, a first region of said strap spaced from said location being extendable through the opening of the buckle to form the ankle attachment into a loop;

said ankle attachment including quick release fastener means for releasably attaching said first region of the strap to a second region of the strap whereby the quick release fastener means can releasably hold the ankle attachment in said loop;



an elongated, flexible, resilient element attachable to the surfboard; and

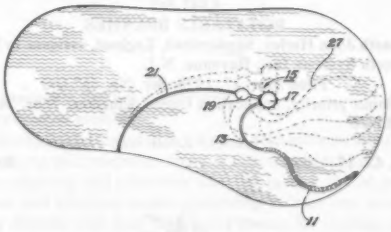
a boss on said buckle for attaching the resilient element to the ankle attachment, said boss having a passage extending therethrough, said resilient element extends into said passage from one end thereof, and said surfboard leash includes means for preventing withdrawal of the resilient element from said passage.

4,041,563

SCOURING SLEEVE FOR USE WITH SWIMMING POOL CLEANER

Claire L. Steeves, 1300 Mistletoe, Fort Worth, Tex. 76110

Filed Mar. 26, 1976, Ser. No. 670,640
Int. Cl.[2] E04H *3/20*
U.S. Cl. 15—1.7 **2 Claims**



1. For use with an apparatus for cleaning sediment deposited on the floor of a swimming pool of the type having a flexible hose having an inlet connected to the swimming pool circulation system and an outlet for discharging water to loosen sediment and to cause the hose to constantly reposition itself, an improved scouring means comprising:

a reticulated sleeve of coarsely woven flexible plastic strips for covering portions of the hose for scouring the floor and walls of the swimming pool as the hose repositions itself; and

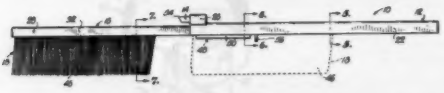
fastener means for retaining the sleeve over the hose comprising a band of plastic encircling the sleeve having means to restrain the band tightly over the sleeve.

4,041,564

COMBINATION SCRAPER AND BRUSH WITH EXTENSIBLE HANDLE

Charles W. Schlicher, Wichita, Kans., assignor to S/V Tool Company, Inc., Newton, Kans.

Filed Feb. 23, 1976, Ser. No. 660,420
Int. Cl.[2] A46B *17/08;* **A47L** *1/10*
U.S. Cl. 15—111 **4 Claims**



1. An extensible scraping and brushing tool of the kind utilized to remove ice and snow from vehicle windows or the like, said tool comprising:

an elongate handle;

a scraper member affixed to said handle at one end thereof;

an elongate brush assembly having at least one brush element proximal an end thereof; and

guide structure integral with said handle and said brush assembly interconnecting the latter with said handle for shiftable movement longitudinally relative thereto.

said brush assembly being reciprocable between a first, retracted position relative to said handle in which said brush element is adjacent an end of said handle to a second, extended position relative to said handle in which said brush element protrudes beyond said end of the handle,

said brsuh assembly including an elongate brush carrier slidable along said handle, said handle and said carrier having corresponding, transverse cross-sectional configurations with said carrier being nested within said handle such that their respective longitudinal axes are substantially parallel,

said brush carrier including an elongate channel having its longitudinal axis in parallelism with the longitudinal axis of said handle and in which said brush element is received,

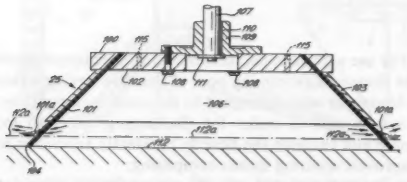
said channel being of a generally U-shaped configuration having opposed, parallel sidewalls, said sidewalls each having an inwardly projecting flange extending longitudinally along its distal edge such that the flanges are in an opposing relationship, said brush element being press fit into said channel for retention therein by said flanges.

4,041,565

ROTATABLE BRUSHES

Kenneth John Hatley, Sanderstead, England, assignor to Butterworth Systems Inc., Bayonne, N.J.

Filed Mar. 17, 1976, Ser. No. 667,608
Claims priority, application United Kingdom, Mar. 24, 1975, 12153/75
Int. Cl.[2] A46B *7/08*
U.S. Cl. 15—200 **8 Claims**



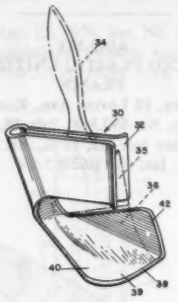
1. A brush adapted for cleaning a surface and having an axis of rotation substantially perpendicular to the surface, comprising a support substantially perpendicular to said axis, bristles attached to one face of the support adjacent to and disposed about the periphery thereof and extending at a diverging angle away from said one face, and a flexible membrane surrounding the bristles and which extends substantially from the support to substantially within 10 mm to 40 mm from the free ends of the bristles remote from said one face, said membrane defining a laterally confined volume with said one face of said support and diverging in substantially the same direction as said bristles and preventing liquid from entering said confined volume, such that the pressure within said confined volume is substantially reduced for producing a corresponding reduction in the power required to rotate said brush.

4,041,566

PAINT BRUSH BRISTLE SHAPING DEVICE

Norman F. Ford, R.D. No. 2, Clymer, Pa. 15726

Filed Apr. 26, 1976, Ser. No. 680,495
Int. Cl.[2] A46B *17/00*
U.S. Cl. 15—257 R **10 Claims**



1. A paint brush bristle shaping device comprising:

holding means for receiving a paint brush and holding the brush; and

a base section spaced from said holding means and having a central portion lying in a plane normal to the longitudinal center line of a brush held by said holding means and side portions extending outwardly from said central portion with at least one of side portions having a flat surface, with said central and side portions being constructed and arranged to shape and retain the bottoms of the bristles of a brush into a generally flared pattern adapted for landscape painting whereby when a setting agent is applied to the bristles the retained shape will be held by the bristles when the brush is removed from the device.

4,041,567

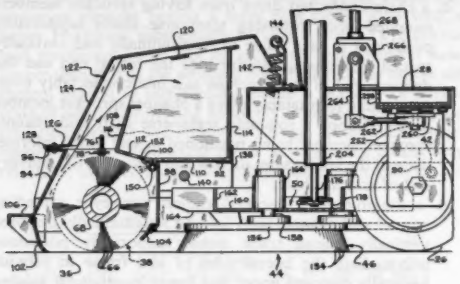
COMBINATION SWEEPING-SCRUBBING APPARATUS

Jack L. Burgoon, Toledo, Ohio, assignor to The Scott & Fetzer Company, Lakewood, Ohio

Filed Apr. 10, 1975, Ser. No. 566,980
Int. Cl.[2] A47L *11/16, 11/18*
U.S. Cl. 15—320 **23 Claims**

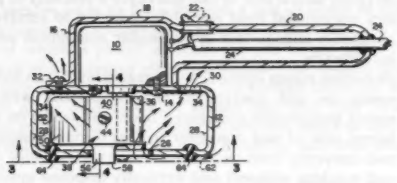
11. A machine for cleaning a surface comprising a main frame, wheels for supporting said frame above the surface, a cleaning solution tank carried by said frame, at least one recovery solution tank posiitoned on said frame, a drum brush mounted below said frame for contacting the surface and for removing debris thereon and for distributing a cleaning solution on the surface, means on said frame near said drum brush for receiving debris therefrom, means for rotating said drum brush, a supply line for supplying cleaning solution from said cleaning solution tank for distribution on the surface by said drum brush, disc brush means located behind said drum brush, said disc brush means being effective to scrub a path of the surface having a width at least substantailly equal to the length of said drum, means for rotating said disc brush means, squee-

gee means located behind said disc brush means to gather the cleaning solution at a central point, and exhaust means for



carrying the solution from the surface to said recovery solution tank.

4,041,568
VACUUM CLEANER
William A. Rhodes, 4421 N. 13th Place, Phoenix, Ariz. 85016
Continuation-in-part of Ser. No. 574,406, May 5, 1975, abandoned. This application Sept. 13, 1976, Ser. No. 722,732
Int. Cl.[2] A47L *5/26*
U.S. Cl. 15—344 **7 Claims**



1. In a vacuum cleaner: a housing having a motor mounted thereon having a motor shaft extending into said housing; a centrifugal impeller rotatably mounted on said motor shaft; said housing having an outlet and a circular inlet opening; said impeller adapted to create an air stream into said housing through said inlet and outwardly through said outlet; said impeller having a flexible flapper portion extending outwardly through said inlet opening beyond said housing; whereby during rotation and centrifugal air pumping operations of said impeller said flexible flapper portion may contact foreign matter on a surface being cleaned to thereby loosen said foreign matter into the air stream entering said inlet opening; said flapper portion extending radially away from the axis of said motor shaft a distance substantially equal to the radius of said housing inlet opening; said impeller being a single blade structure and provided with a radially extending flexible extremity spaced from and adjacent to the inside of said housing to allow lint to be rolled into a ball between the extremity of said impeller and the inner surrounding wall of said housing; whereby said ball may subsequently be dropped from said housing through said inlet opening after the motor is deenergized and the impeller has come to rest.

4,041,569
SEPARATOR SYSTEM
Arne G. Petersen, Oak St., R.R. 26-D, Uxbridge, Mass. 01569
Filed Sept. 13, 1976, Ser. No. 722,410
Int. Cl.[2] A47L *9/10*
U.S. Cl. 15—353 **11 Claims**

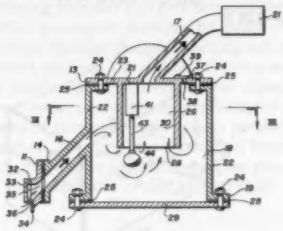
1. A separator system for picking up flow substance from a surface, comprising

a. an exhaust means,

b. an outer chamber having a top with a central opening connected to the exhaust means, having a side wall, and having a bottom,

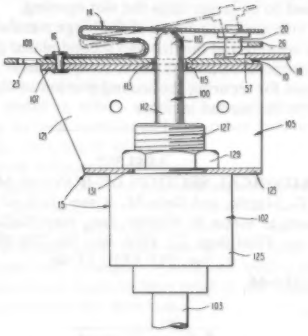
c. an inlet conduit having a first end which enters through the side wall of the outer chamber above a selected level,

d. a pick-up head attached to the other end of the inlet conduit, and



e. an inner chamber positioned within the upper portion of the outer chamber, the inner chamber having a tubular side wall surrounding the central opening and with an open bottom located below the said selected tubular level.

4,041,570
RESETTABLE, HEAT ACTUATABLE FIRE LINK
Francis J. McCabe, 239 Hastings Court, Doylestown, Pa. 18901
Filed Apr. 13, 1976, Ser. No. 676,483
Int. Cl.[2] E05F *15/20*
U.S. Cl. 16—48.5 **7 Claims**



1. A resettable fire link comprising,

a. a releasable member;

b. gripping means associated with said releasable member for engaging said releasable member in a normal position, and for releasing said releasable member in an actuated position, said gripping means comprising at least one mounting element and heat responsive means for causing said gripping means to move to the normal position in response to a preselected ambient temperature and for causing said gripping means to move to the actuated position in response to a preselected increase in said ambient temperature; and

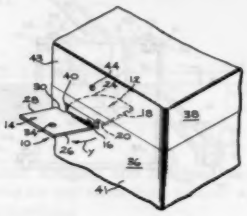
c. mechanical activation means connected to said mounting element for movement from a first withdrawn to a second extended position, said mechanical activation means in said first withdrawn position allowing said gripping means to move between said normal and said activated position and for causing said gripping means to move to the activated position in response to movement of said mechanical activation means to said second extended position.

4,041,571

FASTENING DEVICE AND METHOD FOR HINGEDLY ASSEMBLING MEMBERS

Theodore J. Blevins, Prospect, Ky., assignor to General Electric Company, Louisville, Ky.

Filed May 19, 1976, Ser. No. 687,693
Int. Cl.[2] E05D 9/00
U.S. Cl. 16—128 R **8 Claims**



1. A fastening device for hingedly connecting a first member to a second member, the fastening device comprising:

a. a slot opening through the first member,

b. an integrally formed hinge member having a first planar portion with an end, a second planar portion, and an intermediate portion with its longitudinal axis at the junction of the first and second portions, said first portion having a shoulder formed on one side between the end and the intermediate portion and the other side being curved between the end and the intermediate portion, said first and intermediate portions being dimensioned to pass through the slot opening and the second portion dimensioned to be larger than the slot opening,

c. the intermediate portion of the hinge member being in the slot opening and the first and second planar portions being on opposite sides of the first member, and

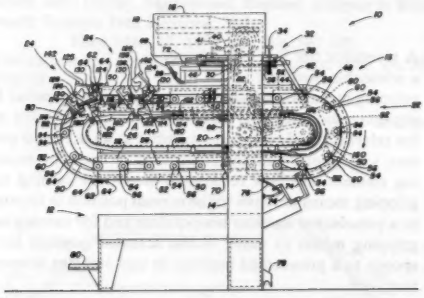
d. means for securing the second portion of the hinge member to the second member.

4,041,572

ANATOMICAL SECTION DE-BONING MACHINE

Eugene G. Martin, and Dale M. Risser, both of Ephrata, Pa., assignors to Victor F. Weaver, Inc., New Holland, Pa.

Filed Sept. 27, 1976, Ser. No. 726,982
Int. Cl.[2] A22C 17/04
U.S. Cl. 17—46 **31 Claims**



1. A machine operable automatically to simultaneously debone individually a similar plurality of appendicular anatomical sections of a small edible animal and deliver therefrom respectively separated a meat component and a bone component, said machine comprising in combination:

a. a longitudinally disposed support frame having interconnected horizontal and vertical members,

b. an infeed end and a delivery end respectively positioned at the opposite longitudinally disposed ends of said machine,

c. a chain connected drive train having sprocket members mounted upon rotatably transverse shafts supportably positioned in said frame in longitudinally and vertically spaced relationship intermediate the infeed end and the delivery end of said machine and interconnectably communicating to rotatably drive a channel sprocket member mounted upon a rotatably transverse shaft said channel sprocket member being positioned in said frame intermediate of the lateral sides thereof and inward of the delivery end of said machine,

d. a longitudinally disposed endless conveyor extending around said channel sprocket and longitudinally disposed vertically spaced track means supportably positioned intermediate the lateral sides of said frame to provide vertically disposed upper and lower longitudinal guiding support spans for said conveyor,

e. drive means supported on said frame and interconnected by chain to one of said sprocket members of said drive train and operable to rotate said channel sprocket and thereby rotatably transport said conveyor in fixed unidirectional endless motion from said infeed end to said delivery end of said machine,

f. a plurality of regularly spaced longitudinally disposed conveyor member connecting rods extending respectively perpendicularly outward either side from said conveyor said rods adapted to receive upon adjacent pairs thereof on either lateral side of said conveyor a plurality of planetery operational head assemblies adapted to receive and clampably engage said appendicular anatomical sections individually,

g. de-boning means operable by engagement of cam follower means on said operational head assemblies with cam means supportably configured upon said frame on either lateral side of said conveyor so that during transport of said conveyor from said infeed end to said delivery end of said machine adjacent said vertically disposed upper longitudinal guiding support span thereof said meat component of said appendicular anatomical sections is individually and successively inversely removed from said bone component,

h. cutting means respectively positioned either lateral side of said frame at the delivery end of said machine to automatically sever meat component to bone component retaining tissue, and

i. means to respectively discharge said meat component and said bone component separately at said delivery end of said machine.

4,041,573

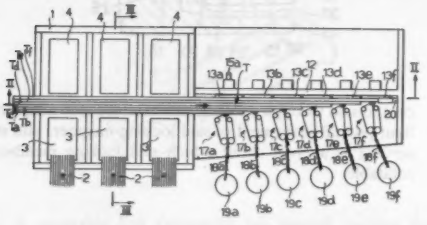
MACHINE FOR COMBING AND GRADING TEXTILE FIBERS

Bernardino Ruspa, Cameri (Novara), Italy, assignor to Sant'Andrea Novara Officine Meccaniche E Fonderie S.p.A., Novara, Italy

Filed May 7, 1975, Ser. No. 575,550
Claims priority, application Italy, June 4, 1974, 68752/74
Int. Cl.[2] D01G 37/00, 19/00, 19/12
U.S. Cl. 19—65 R **3 Claims**

1. A machine for grading textile fibers according to their length comprising feeding means for feeding a free end of a web of textile fibers forward in incremental steps including movable jaw means located at a fixed position, movable grid means, a needle block adapted to be inserted into said grid means and means for moving said grid means and said needle block with respect to said jaw means to feed said web incrementally forwards, gripping means for gripping one end of the fibers at the free end of said web and driving means for moving said gripping means to pull from said free end of said web successive tufts of fibers, comb means for combing the other ends of said fibers of said tufts as they are pulled from said web, conveyor means comprising a plurality of conveyor elements

positioned side-by-side and disposed substantially perpendicular to the direction of movement of said gripping means, each conveyor element having a form of a closed loop with an upper, rectilinear, substantially horizontal run and a return run, said rectilinear upper run of each conveyor element being longer than that of the adjacent conveyor element on the side thereof nearest to said feeding means, a plurality of parallel rows of needles projecting upwardly from and carried by said conveyor element and means for driving all of said conveyor elements at the same linear speed, said gripping means being releasable to place successive tufts adjacent each other on said



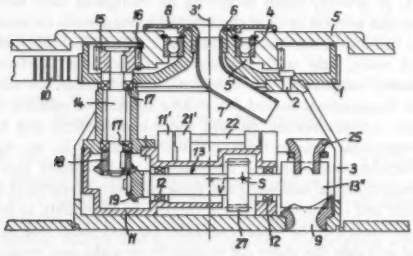
conveyor means with one end of each of said tufts being aligned along a line parallel to the direction of advance of said conveyor means and pressing means for pressing said tufts onto said needles so as to form thereon a mat of fibers of substantially constant thickness and a plurality of fiber selection means one of which is placed adjacent the end of the upper run of each of said conveyor elements whereby the longest fibers of said tufts are withdrawn first and the shortest fibers last as they travel along said conveyor means past said fiber selection means and whereby said needles comb said fibers as said fibers are removed from said conveyor means by said fiber selection means.

4,041,574

COILING DEVICE FOR DEPOSITING SLIVER IN CANISTERS

Peter Müller, Bremen-Lesum, Germany, assignor to Fried. Krupp Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed Sept. 9, 1975, Ser. No. 611,638
Claims priority, application Germany, Sept. 14, 1974, 2444020
Int. Cl.[2] B65H *54/80*
U.S. Cl. 19—159 R **2 Claims**



1. In a coiling device for depositing sliver in a canister including a rotary cage having an axis of rotation; means for rotating the cage; means defining an inlet opening through which the sliver is introduced into the cage; means defining an outlet opening in the cage eccentrically thereof for discharging the sliver in a path orbiting about the cage axis; a first calender roll supported in the cage; drive means connecting the cage with the first calender roll for rotating the first calender roll about its longitudinal axis upon rotation of the cage about the cage axis; a second calender roll supported in the cage on a pivotal shaft mounted in the cage and spaced from the second calender roll; means for urging the second calender roll against the first calender roll for generating a clamping force; means for driving the second calender roll about its longitudinal axis; the second calender roll and the pivotal shaft forming part of a pivotal unit having a center of gravity; the two rolls constituting a cooperating calender roll pair between the inlet opening and the outlet opening for drawing, by means of the clamping force, the sliver through the inlet opening and advancing it through the outlet opening; the roll pair moving with the cage as a unit; the improvement wherein a line representing the shortest distance between the center of gravity of said pivotal unit and said axis of rotation of said cage is parallel to the axis of said pivotal shaft, whereby any centrifugal force generated by the rotation of said cage and exerted on the pivotal unit has a zero torque about said axis of said pivotal shaft.

4,041,575

HOOK ASSEMBLAGE

J. Roderick MacArthur, Winnetka, Ill., assignor to Elder Laboratories, Morton Grove, Ill.

Filed July 29, 1976, Ser. No. 709,873
Int. Cl.[2] A44B *21/00*
U.S. Cl. 24—73 HH **10 Claims**

1. A hook assemblage for removably attaching an object to a fixed surface, comprising:

a pair of plates in which one has securement means for securing to said surface and the other has securement means for securing to said object;

said one plate defining an opening;

first flap means on said other plate which is receivable in said opening to interconnect said plates and limit relative movement of said plates in one direction; and

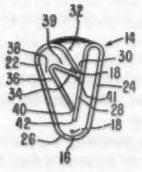
second flap means on at least one of said plates which is constructed and arranged to interlock with a portion of the other of said plates to limit relative movement of said plates in the opposite direction.

4,041,576

ATTACHMENT DEVICE

Carl T. Larson, P.O. Box 54, Richmond, Calif. 94807

Division of Ser. No. 316,959, Dec. 20, 1972, Pat. No. 3,858,281, which is a continuation-in-part of Ser. No. 77,164, Oct. 1, 1970, abandoned. This application Oct. 29, 1974, Ser. No. 518,559
Int. Cl.[2] A44B *9/10*
U.S. Cl. 24—156 **7 Claims**



1. An attachment device comprising: an elongated member; a bar; means interconnecting one end of the member and one

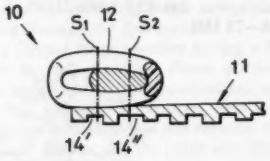
end of the bar and permitting said member to be moved toward and away from the bar; a head having a pair of spaced sides and being secured to the opposite end of the bar, said head having a passage thereinto for permitting the opposite end of the member to move into said head, said passage having an entrance; and a pair of relatively shiftable elements extending into the head from respective sides and between the latter, one of the elements having a pair of spaced extremities thereon, the other element having a surface and being biased into engagement with the extremities of said one element for yieldable closing said passage.

4,041,577

STRINGER FOR SLIDING CLASP FASTENER

Yoshio Matsuda, Nyuzen, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Feb. 24, 1976, Ser. No. 661,023
Claims priority, application Japan, Feb. 28, 1975, 50-25366
Int. Cl.[2] A44B *19/12, 19/02*
U.S. Cl. 24—205.16 C **3 Claims**



1. A fastener stringer which comprises a warp-knit tape and a row of interlocking fastener elements secured thereto, said tape having a web portion formed by chain stitches defining longitudinally extending wales, tricot stitches extending diagonally across and between a plurality of adjacent wales, and laid-in weft threads extending over and connecting every four wales and a longitudinal edge portion defined solely by knit-loop forming threads, including chain stitches defining plural longitudinal wales, and two groups of tricot stitches, the tricot stitches of each group thereof spanning a different number of wales of said chain stitches in the longitudinal edge portion, both of said portions being interconnected transversely of the tape by threads constituting said web portion and said edge portion, respectively, one of said wales adjacent said longitudinal edge portion being biased toward said web portion to widen an interwale valley between said one of wales and its neighboring wale.

4,041,578

AUTOMATIC LOCK SLIDER FOR SLIDE FASTENERS

Kiyoshi Oda, Kurobe, Japan, assignor to Yoshida Kogyo K.K., Japan

Filed Nov. 12, 1976, Ser. No. 741,191
Claims priority, application Japan, Nov. 14, 1975, 50-155378[U]
Int. Cl.[2] A44G *19/30*
U.S. Cl. 24—205.14 R **6 Claims**

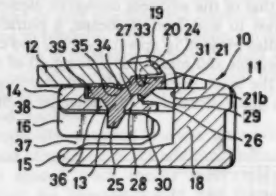
1. An automatic lock slider for slide fasteners which comprises:

a. a slider body having an upper and a lower wing connected by a neck portion, said upper wing having a recess for receiving a leaf spring and through opening parallel with said leaf spring;

b. a pull member pivotally supported on said slider body and having at one of its ends a first cam held in abutting relation to said leaf spring and a second cam parallel to said first cam;

c. a locking member actuated by said second cam and having a locking prong movable through said through opening into the path of fastener elements and disposed in close proximity to said neck portion when the slider is in locked position; and

d. a support stud extending upwardly from said recess adjacent to said through opening and having a stop adapted to limit pivotal movement of said locking member, said stud serving as a pivot about which said locking member is rotatable.

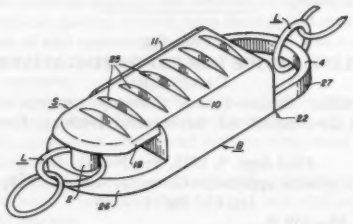


4,041,579

JEWELRY CLASP AND METHOD OF MAKING SAME

Barry H. Chappel, Dublin Road, P.O. Box 69, Southbury, Conn. 06488

Filed Apr. 12, 1976, Ser. No. 676,292
Int. Cl.[2] A44B *13/00, 21/00*
U.S. Cl. 24—230 AK **19 Claims**



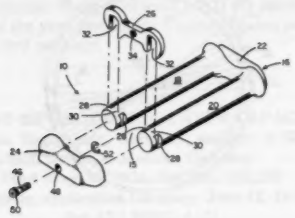
1. A jewelry clasp including an elongated base having a box-like portion open at the top and having walls surmounting the bottom of the base and having a spring-chamber between said walls, said walls having upper slider-bed surfaces for slidably supporting the below-mentioned slider for straight-line longitudinal to-and-fro sliding motion in relation to the base, a slider resting on said slider-bed surfaces and having longitudinal side-surfaces inclined inwardly in an upward direction, two opposite longitudinal slider-guides extending upwardly from said walls and flanking said side-surfaces of said slider and inclined in relation thereto so as slidably to interengage therewith to retain the slider on said slider-bed surfaces and to guide the slider for to-and-fro straight-line longitudinal motion in relation to the base, a link-receiving post carried by said base in front of said box-like portion thereof and spaced therefrom in a longitudinal direction, the top of said post being in operative alignment with said slider-bed surfaces so that the slider can be moved longitudinally thereon to over-ride the top of the post in close proximity thereto, a spring-abutment extending downwardly from said slider into said spring-chamber, a spring operatively interposed between said spring-abutment and an end of said spring-chamber and arranged to urge the slider in the direction of said post, and a link-anchorage at the opposite end of said base.

4,041,580

SEPARABLE LINK CONNECTOR

James Wesley Turner, deceased, late of El Centro, Calif. (by Thomas M. Heim, executor), and Ray E. Spinks, El Centro, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 12, 1976, Ser. No. 648,334
Int. Cl.[2] A44C *5/18*
U.S. Cl. 24—265 AL 2 Claims



1. A separable link connector for aircraft landing drag chutes subject to abrasive and vibrational contact with a runway surface comprising:

a body including a pair of parallel spaced arm members and an end member forming an open-ended integral U-shaped body;

said members having a free end; detachable closure means including a latch member straddling the ends of arm members and having a centrally located threaded hold,

said latch member and arm ends having complementary interlocking shoulder surfaces lying in a plane of connection perpendicular to said common plane, said closure means including an end cap member separate from said latch member and having sockets housing and completely enclosing the free ends of the respective arm members, extending through said cap member and into said threaded hole

a single screw centrally located on the cap member said latch member positioned adjacent and against said cap member facing said arm members, for securing together the end cap member and the latch member;

supplemental means for locking said screw to the latch member; and

whereby said cap member will protect the entire free end of the screw to prevent its engagement with the landing runway.

4,041,581

METHOD FOR COMPACTING WOVEN GAUZE BANDAGES

Edmund A. Diggle, Jr., Ho-Ho-Kus, N.J., assignor to Compax Corporation, Woodside, N.Y.

Filed Oct. 7, 1976, Ser. No. 730,313
Int. Cl.[2] D06C *21/00*
U.S. Cl. 26—18.6 2 Claims

1. A process for the mechanical compressive shrinkage of woven gauze bandage in multiple-ply form in a two-roll differential speed mechanical compactor, having opposed feeding and retarding rollers and a confining shoe cooperating with said feeding roller, which comprises

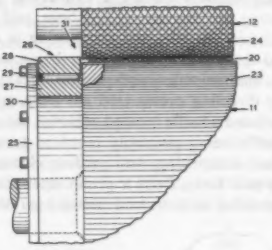
a. providing the feeding roller with an 80 pitch, straight knurled surface characteristic,

b. providing said retarding roller with a 40 pitch diamond knurled surface characteristic,

c. arranging said rollers and said confining shoe whereby the nip space between said rollers is less than the space between said feeding roller and said shoe,

d. feeding the bandage material onto the feeding roller and between said feeding roller and said confining shoe,

e. driving said retarding roller in the same direction as said feeding roller at their points of adjacency but at a significantly lower surface speed, and



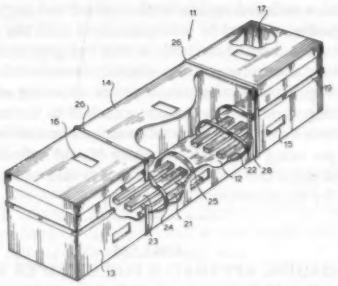
f. longitudinally compressively shrinking said gauze bandage material in a short zone between the terminal edge of the confining shoe and the nip formed by said rollers.

4,041,582

MARINE BURIAL CONTAINER

John P. MacDonald, 1914 Dawn Drive, Melbourne, Fla. 32935

Filed Mar. 25, 1976, Ser. No. 670,149
Int. Cl.[2] A61G *17/00*
U.S. Cl. 27—2 11 Claims



1. A marine burial container comprising in combination:

a paperboard container shaped to receive a corpse for burial; said container having a base with reinforcing material therein and a plurality of sides and said container having a plurality of reinforcing members attached to the sides of said container to increase the rigidity of said container;

weight means located to add weight to said container and to said corpse to reduce the buoyancy of the container and corpse;

means for connecting said weight means to said corpse; and

said container having openings therein at predetermined locations to release entrapped air and allows water in to reduce the buoyancy of said container.

4,041,583

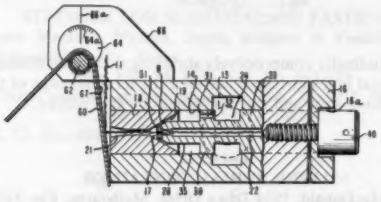
YARN TEXTURING JET

Marvin Sumner Hart, Wilmington, Del., and William James Powers, Jr., North East, Md., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 20, 1976, Ser. No. 688,247
Int. Cl.[2] D02G *1/16*
U.S. Cl. 28—254 1 Claim

1. In a yarn texturing jet including a body having yarn inlet and outlet ends connected by a central bore, means for introducing pressurized gas through a gas inlet into said bore between said ends, a venturi located in said bore at said outlet end, and a yarn guiding element extending into said bore from the yarn inlet end of the body, said element having a passage

therethrough for guiding yarn from the yarn inlet of the body past the gas inlet through the exit end of said element to the venturi, said element having a cylindrical portion thereon approximating the diameter of said bore, said portion extending beyond said gas inlet and terminating in a surface facing and spaced from said venturi, there being an orifice in said portion in communication with said gas inlet and exiting at said surface for directing pressurized gas from said gas inlet into said venturi, and a baffle located adjacent the outlet end of the jet, said baffle being pivotably mounted to a hinge pin, the improvement comprising: said guiding element being axially slidable in said body from a preset operating position to a stringup position back to said preset operating position and



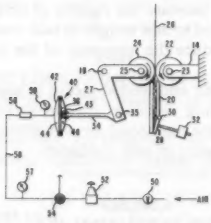
being attached to a flange located outside the body at the inlet end of the body; means for limiting movement of said flange away from the inlet end of the body to said preset operating position; a reduced region in the cylindrical portion on said yarn guiding element in communication with the pressurized gas means and said hole both in said stringup position and in said preset operating position whereby pressurized gas returns the yarn guiding element to said preset operating position from said stringup position, a bracket attached to the outlet end of said jet; and a cylinder rotatably mounted in said bracket, said hinge pin being attached off-center of said cylinder whereby the position of said baffle with respect to said outlet end may be varied by an eccentric motion.

4,041,584

LOADING APPARATUS FOR CRIMPER ROLLS

Thomas Donald Williamson, Lugoff, S.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 29, 1976, Ser. No. 727,660
Int. Cl.[2] D02G *1/12*
U.S. Cl. 28—269 **5 Claims**



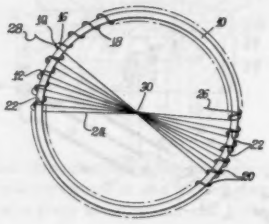
1. In an apparatus for crimping tow including a pair of rolls cooperating to form a nip between the rolls through which tow passes to a crimper chamber associated with said rolls, one of said rolls being movable with respect to the other to form an adjustable width nip, the improvement comprising: a single-acting loading device having a diaphragm dividing a single chamber into front and back chambers; a source of pressurized fluid in communication with the back chamber; a restricter connected between said source and said back chamber; and a linkage passing through said front chamber and connected between said diaphragm and said movable roll.

4,041,585

HAND LOOM CONSTRUCTION

Phill R. Berger; Joan P. Berger, both of P.O. Box 393, Carmel Valley, Calif. 93924, and Margery L. Magnani, 82 Fifth Ave., San Francisco, Calif. 94118

Filed Jan. 5, 1976, Ser. No. 646,656
Int. Cl.[2] D03D *29/00*
U.S. Cl. 28—149 **4 Claims**



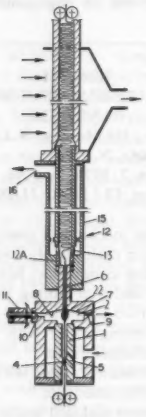
1. In a hand loom construction for receiving strands of yarn, the combination comprising; a rigidly closed base frame having a given perimeter outlining and enclosing an area which is to receive said strands of yarn, a secondary frame adjustably disposed relative to said base frame comprising a resilient wire-like strand encircling said base frame forming a series of helical loops disposed circumferentially about and having a perimeter that at least conforms to the perimeter of said base frame and wherein said base and secondary frame coact to provide holding means for stretchably and adjustably supportng said strands of yarn within said enclosed frame area.

4,041,586

TEXTILE FLUID BULKING PROCESS

Peter William Foster; Duncan Cameron Ferrier; Thomas Berry, all of Tiverton, England, and Karel Murenbeeld, Geneva, Switzerland, assignors to John Heathcoat & Company Limited, Tiverton, England

Filed July 28, 1975, Ser. No. 599,786
Claims priority, application United Kingdom, July 31, 1974, 33884/74
Int. Cl.[2] D02G *1/20, 1/16, 1/12*
U.S. Cl. 28—254 **1 Claim**



1. A process of producing a bulked multifilament yarn having filaments formed of at least one polymer comprising causing a multifilament yarn to be entrained in a stream of fluid at one pressure and at a temperature high enough to plasticize the

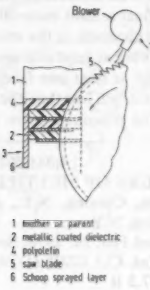
yarn, causing the fluid to discharge into a space of finite volume maintained at a lower pressure by controlled escape of fluid from the space whereby to separate the filaments in the space and thus to bulk the yarn, then causing the bulked yarn to be entrained in a second stream of fluid flowing from said space and to be projected as a continuous operation against one end of an elongated package of already bulked yarn contained in a second space into which the second stream of fluid discharges and in which the pressure is caused to fluctuate between a maximum value and a minimum value with a frequency per second which is at least 1/600 the speed in meters per minute of the yarn just before it comes against said one end of the elongated package.

4,041,587

METHOD OF PRODUCING LAYER CAPACITORS

Hubert Kraus, Regensburg, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed May 24, 1976, Ser. No. 689,255
Claims priority, application Germany, June 11, 1975, 2526130
Int. Cl.[2] H01G *4/22*
U.S. Cl. 29—25.42 **5 Claims**



1. In a method of producing layer cpacitors in which synthetic dielectric layers carrying metallic coatings are formed into a multilayer mother capacitor, in which individual capacitors are cut from the mother capacitor by sawing and the synthetic layers shrink at the cut edges due to the heat generated during sawing causing the metallic coatings adjacent the cut edges to break up into islands which oxidize to become insulating islands and in which the saw blade is lubricated during sawing, the improvement therein comprising the steps of:

applying a meltable polyolefin layer to the mother capacitor before sawing as a lubricating layer; advancing the saw blade relative the mother capacitor to first penetrate the polyolefin layer prior to penetration of the remainder of the mother capacitor;

melting the polyolefin material during sawing; and spreading the melted material along the surfaces produced by sawing to nearly completely seal those surfaces.

4,041,588

MACHINE TOOL PROVIDED WITH A TOOL MAGAZINE

Hans Kuhnert, Munich, Germany, assignor to Friedrich Deckel Aktiengesellschaft, Munich, Germany

Filed July 8, 1975, Ser. No. 594,054
Claims priority, application Germany, July 11, 1974, 2433435
Int. Cl.[2] B23B *39/18*
U.S. Cl. 29—26 R **5 Claims**

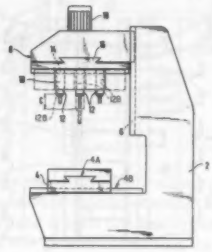
1. A machine tool, comprising:

a base having a support member and a work supporting surface thereon, said work supporting surface having first guide means guiding a movement of said work supporting surface relative to said support member;

tool magazine means mounted on said support member and having a plurality of tools thereon having parallel axes and oriented in rows and columns, said tool magazine having a surface from which said plurality of tools project spaced from said work supporting surface;

second guide means on said support member and said tool magazine guiding said tool magazine means for movement relative to said work supporting surface in a direction parallel to said rows;

third guide means on said support member and said tool magazine guiding said tool magazine means for movement relative to said work supportiing surface in a direction parallel to said columns; a tool driving means operative to drive a tool in registry therewith, said tool driving means



being aligned at a single reference position on said tool machine defining a reference axis which is parallel to the axes of said tools and intersects said support member at the junction of one selected row and one selected column, said reference axis remaining in a fixed location during movement of said work supporting surface on said first guide means and during movement of said tool magazine means on said second guide means; and

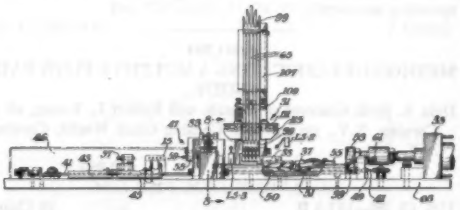
drive means operative to effect a stepwise traverse of said tools in said tool magazine in directions parallel to said rows and columns to facilitate a location of the axes of individual ones of different tools at said single reference position coaxial with said reference axis.

4,041,589

BOBBIN LUGGER

Richard William Black, Manchester, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 23, 1975, Ser. No. 616,021
Int. Cl.[2] B21B *15/00*; B26D *1/06, 5/14*; B27F *7/24*
U.S. Cl. 29—33 M **5 Claims**



1. In a bobbin lugger having a station to which a flanged bobbin and plural terminals are advanced simultaneously from opposite directions and at which the terminals are inserted and staked,

an upright feed assembly having plural slots, each adapted for the passage therethrough of a strip of edge-connected terminals,

a plate normally positioned beneath said assembly, said plate having a plurality of grooves, each in registry with a slot for receiving the last terminal in a strip,

means mounting said plate for sliding movement, and

a reciprocating drive connected to the plate for advancing it to and from said station,

said plate being adjacent said assembly when in the normal position and thereby adapted to sever the last terminal from each strip as it advances toward said station.

4,041,590

BROACHING DEVICE

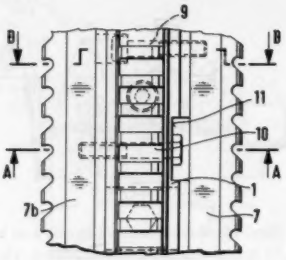
Jürgen Schibrowski, Lohmar, Germany, assignor to Jean Walterscheid GmbH, Lohmar, Germany

Filed Sept. 23, 1976, Ser. No. 726,059

Claims priority, application Germany, Sept. 23, 1975, 2542346

Int. Cl.[2] B23P *15/42*

U.S. Cl. 29—95.1 **7 Claims**



1. A broaching device comprising an elongated body having on one end thereof a stock portion engagable with a stock holder, a cutting portion and a tail piece on the other end thereof, said body portion having a polygonal cross section with an even number of faces, a plurality of toothed cutting elements having threaded apertures in a mounting face and being rigidly and detachably secure on respective opposite ones of a corresponding plurality of said body faces, a plurality of screw elements extending through said body portion in the direction of said opposite faces of said body to engage said apertures and secure said cutting elements thereon, said body having one of recesses and openings therein to provide access to said screw elements, said cutting elements having corresponding recesses.

4,041,591

METHOD OF FABRICATING A MULTIPLE FLOW PATH BODY

Dale A. Noll; Giacomo J. Piazza, and Robert L. Young, all of Corning, N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Feb. 24, 1976, Ser. No. 660,880

Int. Cl.[2] B23P *15/26*; F28F *1/04*

U.S. Cl. 29—157.3 R **10 Claims**

1. An improved method of fabricating a multiple flow path body having a plurality of contiguous flow paths extending therethrough for separate fluid flow, from a honeycombed body having a matrix of thin walls defining a multiplicity of open-ended cells extending from one face end thereof to another face end thereof and being bounded on sides generally parallel to cell axes by generally opposed upper and lower boundary surfaces connected by first and second side boundary surfaces, the cells being grouped into a plurality of columns of cells, each column being separated from adjacent columns of cells by a fluid barrier wall surface extending continuously from the upper boundary surface to the lower boundary surface and from the one face end of the honeycombed body to the other face end thereof, wherein the improvement comprises

a. sealing the open-ended cells on at least one face end of the honeycombed body with a resist material which enters the cells to a predetermined depth, and thereafter becomes removably stiff,

b. forming channels of a predetermined depth in selected columns of cells from the at least one face end of the honeycombed body by removing portions of the cell walls and portions of at least one of the upper boundary surface and the lower boundary surface, all between adjacent fluid barrier wall surfaces in the selected columns of cells,

c. applying a final sealant material to the channels and transforming the channels in the selected columns of cells into conduits having at least one open-end by filling the channels from the at least one face end with the final sealant material to a depth less than the depth of the channels, and

d. removing the remaining resist material.

4,041,592

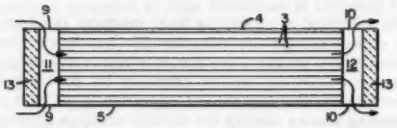
MANUFACTURE OF MULTIPLE FLOW PATH BODY

Everett F. Kelm, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Feb. 24, 1976, Ser. No. 660,879

Int. Cl.[2] B23P *15/26*; F28F *1/04*

U.S. Cl. 29—157.3 R **10 Claims**



1. The method of fabricating a multiple flow path body having a plurality of contiguous flow paths extending therethrough for separate fluid flow, the method comprising the steps of

a. providing a honeycombed body having a matrix of thin walls defining a multiplicity of open-ended cells extending from one face end thereof to another face end thereof and being bounded on sides generally parallel to cell axes by generally opposed upper and lower boundary surfaces connected by first and second side boundary surfaces, the cells being grouped into a plurality of columns of cells, each column being separated from adjacent columns of cells by a fluid barrier wall surface extending continously from the upper boundary surface to the lower boundary surface and from the one face end of the honeycombed body to the other face end thereof,

b. removing portions of at least one of the upper and lower boundary surfaces and portions of the cell walls joining opposed fluid barrier wall surfaces in selected columns of cells near at least one face end of the honeycomed body to provide, respectively, fluid openings in the boundary surface or surfaces and fluid flow grooves extending from the openings and face end to cells in the selected columns, and

c. sealably enclosing the fluid flow grooves near a face end of the honeycombed body to form fluid flow conduits,

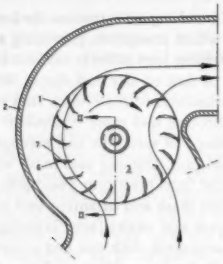
such that first fluid flow paths are formed from the openings through the fluid flow conduits and the cells in the selected columns of cells to the other open ends thereof; and second fluid flow paths are formed through open-ended cells in unselected columns of cells.

4,041,593

METHOD OF MAKING IMPELLERS FOR CROSS-FLOW FANS

Knut Olof Lennart Wallman, Fergas Aktiebolag Harstenagatan 2 S-582 21, Linkoping, Sweden

Division of Ser. No. 502,097, Aug. 30, 1974, Pat. No. 3,970,411, which is a continuation-in-part of Ser. No. 347,340, April 2, 1973, abandoned. This application Apr. 6, 1976, Ser. No. 674,297
Int. Cl.[2] B23P *15/00*; B21D *53/00*; B23P *11/00*
U.S. Cl. 29—156.8 CF 10 Claims



1. The method of making a blower rotor of the type that comprises at least one sheet metal disc and a plurality of elongated blades which are secured to the disc at circumferentially spaced intervals around it and extend lengthwise parallel to the axis of the disc, said method being characterized by:

A. forming each of said blades with a substantial curvature across its width that is uniform along most of the length of the blade, but with the blade having, at a location at which it is to engage a disc, an indentation deformed within the blade and that
   1. is elongated transversely of the blade,
   2. has a curvature along its length which is substantially less than said curvature of the remainder of the blade.
   3. has a width (as measured lengthwise of the blade) that is substantially equal to the thickness of said disc, and
   4. is in flatwise offset relation to adjacent portions of the blade that have the first mentioned curvature;

B. forming the disc with a plurality of circumferentially spaced slots that open unrestrictedly to its periphery, one slot for each blade, each of said slots defining a pair of opposite edges which have a slightly different curvature along their lengths than said curvature of the indentation in the blade, said edges being spaced apart by a substantially uniform distance along their lengths but by a projected distance which is slightly less than the projected thickness of the blade through the indentation; and

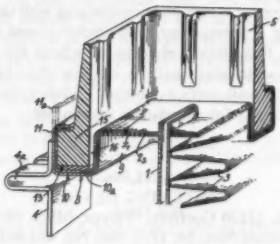
C. inserting the indentation portion of each blade into a slot in the disc by forcing the blade edgewise thereinto, the shape and spacing of the edges of each slot being such in relation to the curvature and thickness of the indentation in the blade that each indentation is flexed along its length when received in its slot so that the blade is thus held against displacement relative to the disc.

4,041,594

BRAZED CORE RADIATOR IN ALUMINUM ALLOY AND ADDED HEADER BOXES

André Chartet, Meudon, France, assignor to Societe Anonyme des Usines Chausson, Asnieres, France

Division of Ser. No. 378,874, July 13, 1973, abandoned. This application Apr. 28, 1975, Ser. No. 572,448
Claims priority, application France, Aug. 2, 1972, 72.27893
Int. Cl.[2] B23P *15/26*
U.S. Cl. 29—157.3 C 14 Claims



1. A method of the manufacture of radiators having a tube and fin core made of aluminum-containing metal, the core including tube plates and at least one header box connected to the tube plates by a soft gasket, comprising the steps of:

assembling fins to brazing alloy plated tubes;

providing tube plates made of laminated sheets of aluminum-containing metal and laminated with brazing alloy to form a laminate having a surface free of brazing alloy directed towards said header box;

shaping said laminate to delimit at the periphery of said laminate a hollow rim having a smooth inner bottom surface, said smooth inner bottom surface being free of brazing alloy;

assembling said tube plates on ends of said tubes, as an assembly, with said smooth inner bottom surface of said hollow rim directed outwardly of the radiator;

heating said assembly to brazing temperature, whereby said brazing alloy is melted thus brazing said tubes, fins and tube plates while smooth surface of each of said tube plates remains free from brazing alloy;

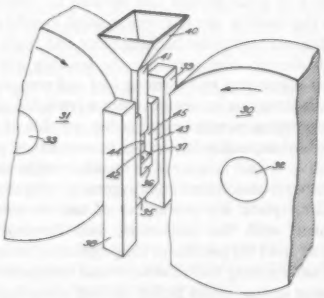
placing a soft deformable gasket on said smooth surface; and securing with pressure said header box on said gasket.

4,041,595

EXTRUSION PROCESS

William G. Voorhes, East Greenwich, R.I., assignor to Wanskuck Company, Providence, R.I.

Filed June 1, 1976, Ser. No. 691,353
Int. Cl.[2] B21C *27/00, 33/00*
U.S. Cl. 29—420 6 Claims



1. A process of continuously forming feedstock comprising the steps of providing a gripping means, gripping two opposed

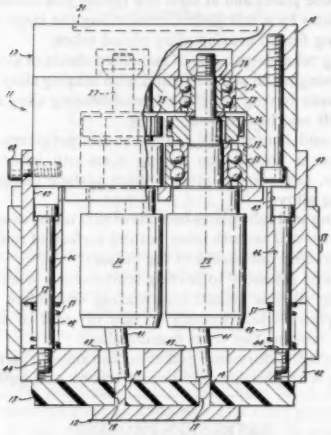
sides of feedstock material whereby the two opposing sides of the material are compressed to a pressure greater than the yield strength of the material, providing a fork-shaped element having opposed constraining walls, locating a die means in the vicinity of the base of the fork, moving the feedstock toward the die means by the gripping means, maintaining the gripping force greater than the yield strength of the material throughout the fork-shaped element, whereby as the feedstock is urged against the base of the fork, the feedstock upsets against the constraining wall surfaces and passes out through the die means, the gripping means advancing the feedstock into the fork, said gripping means and constraining wall surfaces of said fork forming a passageway, that improvement consisting of providing a fork-shaped element in which the distance between the constraining walls is not less than two times the height of said wall surfaces so that no lubrication of the ungripped surfaces of the feedstock is required.

4,041,596

FASTENING DEVICE

George Mink, 13130 Geoffrey, Warren, Mich. 48093

Filed Nov. 24, 1975, Ser. No. 634,661
Int. Cl.[2] B23P *11/00*; B21J *15/12*
U.S. Cl. 29—243.53 8 Claims



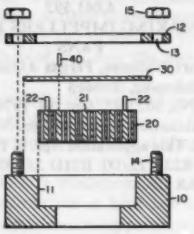
1. A fastening apparatus for affixing a trim piece having a projection to a backing piece having an opening therethrough, said fastening apparatus comprising a forming tool adapted to cooperate with the projection to upset the portion of its end extending through the backing piece opening against one side of the backing piece around said opening for affixing the trim piece to the backing piece, a compression member adapted to engage the one side of the backing piece and apply a compressive load thereto contiguous to the backing piece opening, means for supporting said forming tool and compression member for simultaneous movement from a retracted position until said compression member engages the one side of the backing piece and subsequently for limited movement of said forming tool relative to said compression member while said compression member is maintained in engagement with the one side of the backing piece for movement of said forming tool into engagement with the projection, said forming tool being adapted to upset the portion of the projection during the movement of said forming tool relative to said compression member, and biasing spring means acting on said compression member for applying a predetermined compression load upon the backing piece through said compression member upon the relative movement and during the upsetting of the projection portion.

4,041,597

METHOD OF MANUFACTURING A DIE FOR EXTRUDING HONEYCOMB ARTICLES

Robert G. Folmar, Corning, and Ronald J. Weetman, Rochester, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed Aug. 19, 1976, Ser. No. 716,068
Int. Cl.[2] B23P *17/00*
U.S. Cl. 29—423 8 Claims



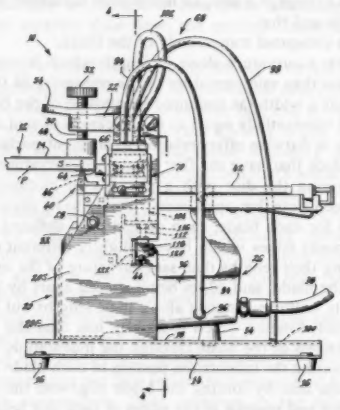
1. A method of making an extrusion die for forming honeycomb structures which comprises, providing a die body having an outlet face, forming feed holes in said die body, providing a plurality of pins of desired size and shape, forming a fixturing mask from a photosensitive material with a plurality of openings extending through said mask equivalent to the cross sectional size and shape of said pins and arranged in the desired orientation of said pins, aligning said mask with said die body adjacent said outlet face, positioning said pins within the openings formed in said mask and orienting said pins in a predetermined pattern upon said outlet face, fixturing said pins within the openings of said mask with one end of said pins in engagement with said die body, welding said pins to said die body, and removing said mask from said pins.

4,041,598

PNEUMATICALLY OPERATED STAPLING APPARATUS AND METHOD

Joseph J. D'Angelo, 378 Annette Court, Wycoff, N.J. 07481, and Joseph J. D'Angelo, Jr., 53 Iroquois Ave., Oakland, N.J. 07536

Filed June 30, 1976, Ser. No. 701,427
Int. Cl.[2] B23P *11/00*
U.S. Cl. 29—432 18 Claims



1. A pneumatically operated stapling apparatus for inserting a staple into a workpiece, such as a hand held panel and a sheet of material to be mounted thereon, whenever the workpiece is

placed in a stapling position between a staple driver and a backing member, comprising:

a pneumatic stapler of the type having a staple driving mechanism controlled by means positionable either to connect the pneumatic air supply to the staple driving mechanism to advance the staple driver toward the backing member, or to block the air supply and to retract the staple driver;

a trigger element positioned to be depressed by the workpiece as it is placed in the stapling position; and

pneumatic control means actuated by depression of the trigger element for first positioning the stapler control means to cause the staple driver to advance and insert a staple into the workpiece, and then, while the trigger element remains depressed, for automatically changing the position of the stapler control means to retract the staple driver away from the workpiece to be removed from the stapling position to release the trigger element.

17. A pneumatic stapling method for inserting a staple into a workpiece, such as a hand held panel and a sheet of material to be mounted thereon, whenever the workpiece is placed in a stapling position between a staple driver and a backing member, using a pneumatic stapler of the type having a staple driving mechanism controlled by means positionable either to connect the pneumatic air supply to the staple driving mechanism to advance the staple driver, or to block the air supply and to retract the staple driver, said method for inserting a staple comprising:

depressing a trigger element with the workpiece as is placed in the stapling position,

in response to depression of the trigger element, first positioning the stapler control means to cause the staple driver to advance and insert a staple into the workpiece, and

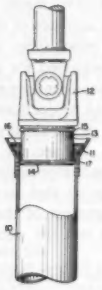
while the trigger element remains depressed, automatically changing the position of the stapler control means to retract the staple driver away from the workpiece and to permit the workpiece to be removed from the stapling position to release the trigger element.

4,041,599

METHOD OF CONCENTRIC BONDING OF A ROD IN A TUBULAR SHAFT

Derek Reginald Smith, Bristol, England, assignor to Union Carbide Corporation, New York, N.Y.

Filed Apr. 14, 1976, Ser. No. 676,866
Int. Cl.[2] B23P *11/02*
U.S. Cl. 29—451 **24 Claims**



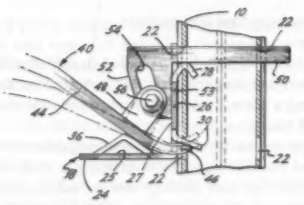
1. A process for securely bonding a rod concentrically in a tubular shaft which comprises: (1) fitting a pair of parallel annular grooves positioned near the base and top of the mating portion of the rod with a pair of resilient sealing rings having inner diameters such that they are retained in place by the grooves and outer diameters greater than that of the mating portion, said sealing rings being designed to fit snugly into the tubular shaft and form a tight fit between the mating portion and the shaft; (2) inserting the base of the mating portion containing the first of said resilient sealing rings into one end of the tubular shaft so as to compress said resilient sealing ring snugly between the mating portion and the inner circumference of that end of said tubular shaft, said end of said tubular shaft having the neck of a funnel tightly fitted about its outer circumference; (3) filling the funnel with a suitable liquid bonding agent; (4) further inserting the mating portion of the rod into the tubular shaft, thereby creating a vacuum in the annular spacing between said mating portion and said tubular shaft so as to cause the bonding agent in the funnel to flow into and fill said annular spacing; (5) continuing to insert the mating portion of the rod into the tubular shaft until the annular space between said mating portion and said tubular shaft has been completely filled with bonding agent and the second resilient sealing ring at the top of the mating portion has been forced into the shaft and snugly compressed between said mating portion and said tubular shaft, thereby entrapping and sealing said bonding agent in said annular space; and (6) curing said bonding agent to the thermoset state so as to bond the shaft and the mating portion of the rod together in concentric alignment.

4,041,600

METHOD OF ASSEMBLING STORAGE SYSTEM

Frederick Ruediger, Willow Grove, Pa., assignor to Standard Pressed Steel Co., Jenkintown, Pa.

Filed Mar. 19, 1976, Ser. No. 668,369
Int. Cl.[2] B21D *39/00*; **B23P** *11/02*
U.S. Cl. 29—513 **4 Claims**



1. A method of assembling a storage system including the steps of:

providing support posts having aligned slots extending along at least one face thereof;

erecting said support posts in a generally vertical position whereby said slots extend along a generally vertical line and face in the same direction;

providing a support member having a first leg providing a track surface along which storage containers can slide and on which storage containers can be supported, and having a second leg providing a guide surface for guiding storage containers sliding along said track surface, said second leg being provided with first connecting means at one end and second connecting means at the other end, said connecting means including a hook member and a tab member each of said tab members forming an angle greater than 90° with the surface portion of said second leg located between said hook member and said tab member;

inserting said hook members into aligned slots on said support posts so that said hook members underlie the outer surface of said post members, and rotating said support member to insert said tab members into other aligned slots on said support posts;

thereafter applying a bending force to said tab members to bend said tab members toward said hook members until said tab members form an angle less than 90 ° with the surface portion between said hook members and said tab members whereby said tab members underlie the outer surface of said support post members

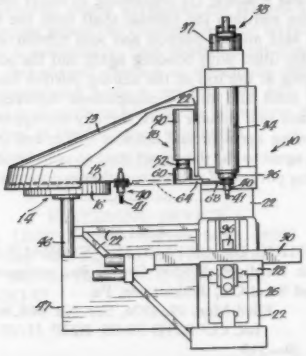
providing a reaction surface in said slots in which said hook members are received so that when said bending force is applied to said tab members it reacts through said reaction surface.

4,041,601

MACHINE TOOL WITH AN AUTOMATIC TOOL CHANGER

Freddie G. Schimanski, Portage, Mich., assignor to Wells Manufacturing Corporation, Three Rivers, Mich.

Filed Mar. 12, 1976, Ser. No. 666,324
Int. Cl.[2] B23Q 3/157
U.S. Cl. 29—568 10 Claims



1. A machine tool comprising:

a frame;

a rotatable tool spindle journaled in said frame;

a tool storage magazine rigidly mounted on said frame and having a plurality of tool storage slots for storing a plurality of tools;

indexing means for said storage magazine to present a selected tool storage slot containing a tool to an engaging position for tool pickup and to subsequently present a selected empty storage slot to said engaging position for tool replacement;

tool changer means for transferring tools between said storage magazine and said spindle comprising a carriage slidably mounted on said frame for sliding substantially parallel to the axis of said spindle and a boom pivotally mounted on one end in said carriage, said boom having mounted thereon first and second telescoping tool transfer arms substantially coplanar and perpendicular to the axis of said spindle and said telescoping tool transfer arms extending away from one end of the boom displaced relative to each other at a fixed acute angle and together with the boom forming a substantially Y-shape;

motor means for sliding said carriage to raise and lower said boom reciprocally and substantially perpendicular to the plane of said transfer arms, and substantially parallel to the axis of said spindle;

motor means for pivoting said boom together with said transfer arms in a plane substantially normal to said spindle axis whereby each of said transfer arms can be positioned to engage a tool at said storage magazine engaging position and present said tool for reception by said spindle; and

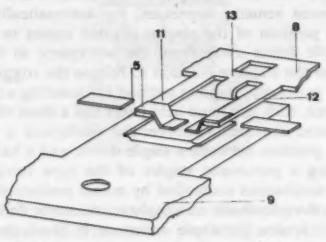
control means for energizing said motor means and operating said storage magazine and said tool changer means whereby said boom is moved in sequence to locate said first transfer arm at said storage magazine engaging position to pick up a new tool, to subsequently locate said second transfer arm at said spindle to remove a used tool from said spindle, to subsequently locate said first transfer arm at said spindle to load said new tool into said spindle, and to subsequently locate said second transfer arm at said storage magazine engaging position to replace said used tool.

4,041,602

METHOD OF PRODUCING SEMICONDUCTOR COMPONENTS AND STRIP FOR CARRYING OUT THE METHOD

Altan Akyuerek, Heppenheim, and Eckhard Meyer, Lampertheim, both of Germany, assignors to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Mar. 11, 1976, Ser. No. 665,763
Claims priority, application Germany, Mar. 14, 1975, 2511209
Int. Cl.[2] B01J 17/00
U.S. Cl. 29—588 7 Claims



1. A process for the production of semiconductor devices by contacting the electrodes of disk-like semiconductor bodies having at least one p-n junction with a first prefabricated metal strip in the form of a comb whose comb projections are designated as contact projections, and comprising the steps of:

providing a second metal strip coated with solder at least on one side as an intermediate connection between the semiconductor bodies and the contact projections of the first metal strip;

uniformly bending the second metal strip into a number of identical sections each having a wing-like profile viewed normal to the length of the second metal strip;

next placing the side of the second metal strip which is opposite the wings onto the top main surfaces of the semiconductor bodies;

pre-attaching the semiconductor bodies to the second metal strip;

providing the first metal strip designated for connection with the wings and by means of these with the electrodes on the top main surfaces of the semiconductor bodies;

providing a third metal strip, in the form of a comb with cooling fins, designated for contacting the bottom main surfaces of the semiconductor bodies;

aligning the contact projections of the first metal strip and the cooling fins of the third metal strip;

then introducing the second metal strip with the pre-attached semiconductor bodies between the first and second metal strips so that its length runs normal to the direction of alignment of the contact projections of the first metal strip and the cooling fins of the third metal strip;

holding together the comb system thus formed by the three metal strips and the semiconductor bodies;

soldering the comb system while pressing down the second metal strip;

severing the second metal strip between the electrodes on the semiconductor bodies to disconnect the conducting links formed thereby;

lacquering the comb system;

baking the comb system;

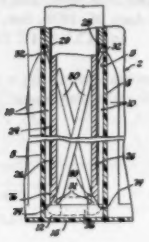
surrounding the comb system with plastic except for part of the contact projections; and

dividing the comb system into individual constructional units.

4,041,603
RIB TRIMMING OF UNIVERSALLY MOLDED BATTERY CONTAINER

Robert H. Thune, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 17, 1976, Ser. No. 715,070
Int. Cl.[2] H01M *2/02*
U.S. Cl. 29—623.1 3 Claims



1. A process for adapting a standarized multicell open-topped battery case to use with multi-plate cell packs having different thicknesses depending primarily on the number of plates per pack, said case comprising end walls and intercell partitions paralleling said end walls for dividing said case into a plurality of individual cell compartments, said partitions and end walls having ribs thereon extending into said compartments in substantially opposed relation one to another for engaging and securely holding cell packs therebetween, said process comprising: forming said case with its ribs standing in relief a first predetermined elevation beyond their associated walls and partitions so as to have the distal portions thereof spaced apart one from the other across said compartment by a gap substantially equal to the thickness of the minimum-plate cell pack useful with said case; aligning said ribs with rib-trimming means, adapted for insertion into said compartments, said rib-trimming means including trimmers for removing predetermined amounts of said ribs and guide means cooperatively associated with said trimmers and adapted to engage said walls and partitions for guiding said trimmers into said compartment in a substantially uniform spaced relation from said ribs' associated walls and partitions; and inserting said rib-trimming means into said case through the open top thereof with said guide means engaging said walls and partitions, and progressively removing said predetermined amounts of said ribs such that the remanents thereof have a second lesser predetermined elevation than said first predetermined elevation and said gap is increased to approximately the thickness of cell packs having more plates than said minimum-plate cell pack and which are actually destined for use with the particular case being formed; whereby a single, universal-sized battery case is readily adapted to accommodate cell packs having different thicknesses so that a variety of batteries having different energy capacities may be produced from a standardized case.

4,041,604
METHOD OF TERMINATING AN ELECTRICAL WIRE IN AN INSULATING HOUSING

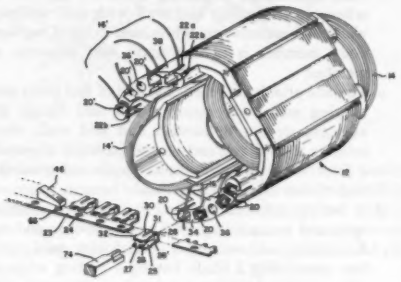
George Nelson Ackley, Hershey, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Division of Ser. No. 618,649, Oct. 1, 1976, Pat. No. 3,984,908.
This application June 10, 1976, Ser. No. 694,753
Int. Cl.[2] H01R *43/00*
U.S. Cl. 29—628 4 Claims

1. A method of attaching a contact terminal to an electrical conductor and positioning said terminal and said conductor in a terminal receiving cavity in an insulating housing, said terminal having conductor receiving means for establishing electrical contact with said conductor upon relative movement of said terminal towards the axis of said conductor, said method comprising the steps of:

positioning said insulating housing with said cavity in alignment with an elongated insertion ram having a forward end and a rear end, said ram being movable towards and away from said cavity, positioning said conductor between said cavity and said forward end of said ram with said conductor spanning said cavity,

positioning said terminal in a guide track between said ram and said conductor with said terminal in alignment with said cavity and with said conductor receiving means in alignment with said conductor,



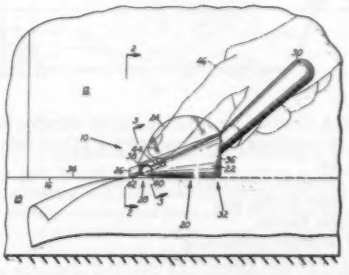
positioning a depth control device having first and second ends with said first end against an appropriate reference surface of said housing and between said housing and a ram stop fixed to said ram and located at said rearward end of said ram, and

moving said ram along said guide track with said front end of said ram pushing said terminal into said cavity so that said conductor receiving means establishes electrical contact with said conductor, with further movement of said ram being prevented when said ram stop abuts said second end of said depth control device, whereby the final position of said conductor and said terminal with respect to said reference surface is determined by the relative length of said depth control devices and said ram.

4,041,605
WALLPAPER TRIMMER

Leroy K. Selfridge, Vista, Calif., assignor to Eugene W. Selfridge, Portland, Oreg.

Filed July 12, 1976, Ser. No. 704,500
Int. Cl.[2] B26B *29/00*
U.S. Cl. 30—293 6 Claims



1. A wallpaper trimming device for cutting wallpaper at a joint between a wall being papered and an adjacent structural member, said trimming device comprising:

a. a body member for positioning said trimming device against said adjacent structural member and guiding said

wallpaper gradually into said joint, and body member having a base end, an apex end and a conical outer surface, said body member providing a first position reference when placed with said conical outer surface resting upon said adjacent structural member, said apex end proximate the line of said joint and said base end spaced away from said wall;

b. a substantially flat flange attached along one edge thereof to said body member such that the plane of said flange is substantially tangent to said conical outer surface of said body member, said flange extending outwardly therefrom, for positioning said trimming device against said wall being papered and pressing said wallpaper against said wall, said flange providing a second position reference when placed against said wall with said wallpaper sandwiched therebetween while said conical surface of said body member is resting upon said adjacent structural member;

c. a handle attached to said base end of said body member for moving said body member and said flange along said adjacent structural member and said wall, respectively, relative to said first and second position references and in a direction generally from said apex end toward said base end of said body member; and

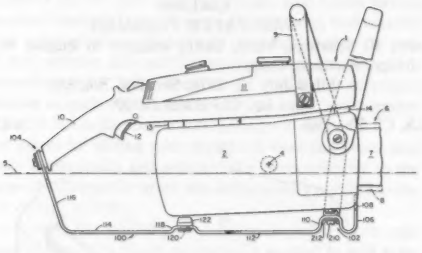
d. a cutting member attached to said body member at said apex end intermediate said body member and said flange for cutting said wallpaper at said joint, said cutting member comprising a blade having a cutting edge along one side, said blade being mounted on the same side of said flange as said body member at an angle from said flange in the direction of said body member and extending therefrom such as to have said cutting edge closely proximate said joint when said body member and said flange are positioned against said adjacent structure and said wall, respectively.

4,041,606

CHAIN SAW WITH FLEXIBLE SKID AND VIBRATION AND RESONANCE REDUCING MEANS

Stephen E. Thompson, Los Angeles, Calif., assignor to McCulloch Corporation, Los Angeles, Calif.

Filed Oct. 7, 1976, Ser. No. 730,638
Int. Cl.[2] B27B *17/02*
U.S. Cl. 30—381 **12 Claims**



12. A structure for reducing handle vibration and resonance and for inhibiting vibrational creep in a chain saw, which chain saw has

a vibration inducing drive assembly,
a front handle, and
a rear handle,

said structure comprising

an elastically resilient leaf spring skid;
a first stress relieving attachment means connecting said skid to said front handle; and
a second, stress relieving attachment means connecting said skid to said rear handle;
said first and second stress relieving attachment means and the elastic resilience of said leaf spring cooperating to reduce handle vibrations,
reduce resonance, and
inhibit vibrational creep of said chain saw when said skid is rested on a surface and the drive assembly is idling.

4,041,607

COMPOSITION AND METHOD FOR FORMING DENTAL RESTORATIONS

Arie L. Hirsch, 2241-16th Ave., San Francisco, Calif. 94116

Filed Apr. 26, 1976, Ser. No. 680,401
Int. Cl.[2] A61C *13/00*
U.S. Cl. 32—8 **2 Claims**

1. In a dental restoration having a metal frame the improvement comprising: forming said metal frame from an alloy of the composition

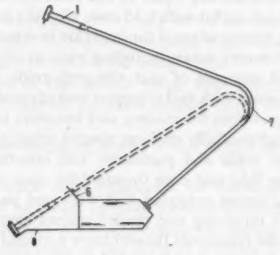
	Weight %	
	Min.	Max.
Nickel (+ Cobalt)	72.0	
Carbon		0.15
Manganese		1.00
Iron	6.00	10.00
Sulfur		0.015
Silicon		0.50
Copper		0.50
Chromium	14.00	17.00

4,041,608

CONNECTING LEAD SUPPORTS

Sven Vilhelm Emanuel Lundin, Wurzburg, Germany, assignor to Avenska Utvecklingsaktiebolaget (SU), Stockholm, Sweden

Filed Dec. 13, 1974, Ser. No. 532,490
Int. Cl.[2] A61C *19/02*
U.S. Cl. 32—22 **9 Claims**



1. In combination, with a housing and an instrument, a lead connected at one end to said housing and at the other end to said instrument, a support for said lead, said support comprising a flexible band, which runs longitudinally alongside and parallel to the longitudinal dimension of the lead, means connecting the band to the lead along the entire length of the lead, said band being arcuately shaped in cross-section and having its concave surface facing said lead wherefore the same is characterized by a degree of longitudinal stiffness.

4,041,609

FOOT CONTROL FOR DENTAL EQUIPMENT

Robert A. Bresnahan, York, Pa.; Edward W. Bass, Claymont, Del., and William G. Mader, York, Pa., assignors to Dentsply Research & Development Corporation, Milford, Del.

Filed May 21, 1976, Ser. No. 688,863
Int. Cl.[2] A61C *19/02*
U.S. Cl. 32—22 **16 Claims**

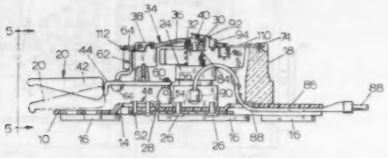
1. A foot control unit for fluids delivered to dental instruments comprising in combination,

a. a base adapted to be supported upon a surface such as a floor,

b. a control unit supported upon said base and including a plunger projecting therefrom and adapted to be moved axially in one direction to effect delivery of fluids to a dental instrument,

c. an actuating member supported above the upper end of said plunger of said control unit,

d. a plurality of foot-engageable members movably supported by said base at circumferentially spaced locations for movement selectively in horizontal and vertical directions,



e. connecting members respectively extending between said foot-engageable members and said actuating member, and

f. depressing means on said connecting members operable to move said actuating member in a direction to move said plunger in said one direction when said foot-engageable members are moved in either said horizontal or vertical directions

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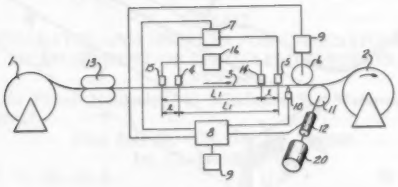
4,041,610

APPARATUS FOR PRECISE MEASUREMENT OF THE LENGTH OF LONG LENGTH MATERIALS

Minoru Uesugi; Susumu Ihara, and Katsumi Mizuuchi, all of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 549,948, Feb. 14, 1975, abandoned. This application June 4, 1976, Ser. No. 693,213
Int. Cl.² G01B 7/04
U.S. Cl. 33—127 **3 Claims**



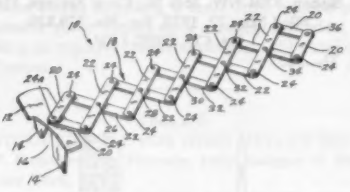
1. An apparatus for precise measurement of the length of longitudinally traveling long length materials comprising, a magnetic powder application device to apply a magnetic powder layer to the moving long length material, a magnetic device located downstream of said application device to periodically make a magnetic mark on said magnetic powder layer, a mark detector positioned a predetermined unit length downstream from said marking device to detect said magnetic marks as they pass by said detector, and operable upon detection of a magnetic mark to actuate said magnetic marking device to apply a magnetic mark to said magnetic powder layer, a second mark detector positioned said unit length downstream from said magnetic powder application device and operable upon detection of a magnetic mark to actuate said magnetic powder application device to apply said powder periodically to said material for marking.

4,041,611

MEANS OF MEASURING A PUPPY'S TAIL FOR SURGICALLY DOCKING THE SAME

Vernon B. Dvorak, 7211 Hickory Grove Road, Cary, Ill. 60013

Filed Aug. 18, 1975, Ser. No. 605,250
Int. Cl.² B43L 9/08; A61B 5/10
U.S. Cl. 33—174 D **1 Claim**



1. A puppy tail docking gauge comprising:

a lazy-tong means comprised of a plurality of tong elements pivotally secured together to form pivotally secured tong sections; said lazy-tong means including an end tong section comprised of two tong elements, means pivotally connecting said two tong elements to define an end pivot point,

a flat guide bar means secured to said end pivot point and dwelling in substantially the same plane as said lazy-tong means, said guide bar means adapted to engage the pelvic bone of the puppy whose tail is to be docked,

a flange means on said flat guide bar means extending transversely with respect thereto and generally at right angles with respect to said lazy tong means, said flange means dwelling in the same plane as said end pivot point,

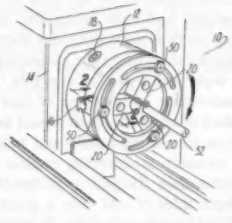
said flange means having a centrally disposed opening formed therein for receiving the tail of the puppy as the tail is extended along said lazy-tong means.

4,041,612

JAW TENSIONING DEVICE

Robert P. Skubic, 1005 Grant, Clawson, Mich. 48017

Filed Mar. 29, 1976, Ser. No. 671,595
Int. Cl.² G01B 3/30
U.S. Cl. 33—181 R **8 Claims**

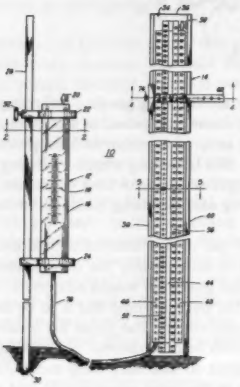


1. For use in conjunction with a chuck having at least two jaws, each jaw having a surface for gripping a workpiece, means for adjusting said jaws radially toward said workpiece; means for radially moving said jaws away from said workpiece and against said radial adjustment means comprising; a flat ring having at least two cam slots formed therethrough, said cam slots being formed as eccentric arcs wherein the centers of the eccentric arc for each cam slot lie on a circle which has as its center the axis of the chuck, said ring positioned coaxially on said chuck so that the ring is radially spaced from the workpiece gripping surfaces of said jaws;

at least two cam followers, each cam follower having a first portion and a second portion, wherein the first portion of

each cam follower is fixed to each of said jaws and wherein the second portion of each cam follower is slidably received in one of said cam slots in said ring whereby rotation of said ring tensions each of said jaws radially away from said workpiece.

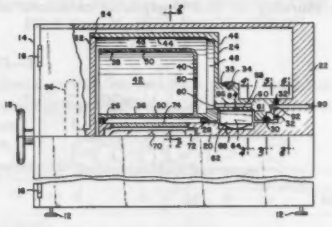
4,041,613
HYDROSTATIC LEVEL INSTRUMENT
Dale F. Bishop, 8704 NW. 35th St., Coral Springs, Fla. 33065
Filed May 22, 1975, Ser. No. 579,839
Int. Cl.[2] G01C *5/04*
U.S. Cl. 33—367 **4 Claims**



1. A hydrostatic level instrument, comprising: a liquid containing reservoir having a transparent side wall, said reservoir being generally elongated and having a uniform internal cross section, said side wall having a fixed graduated scale including uniformly spaced indicia increasing above and below a zero mark; a level including an elongated rod including a web and a pair of spaced flanges, one on each of the ends of said web, and being generally in the form of an "I" in cross section; said rod having at least one fixed scale including indicia directly measuring distances above a zero point at the bottom thereof; a transparent tube mounted on the web within the space between said flanges, said tube being flat and rectangular in transverse cross section with the sides thereof in contiguous relation with each other, said tube extending across the major width of said web; and a pair of movable tapes mounted for longitudinal movement, at least one of said tapes being movable over the face of said tube, each of said tapes having a scale including indicia increasing above and below a zero indicia thereon, said movable tapes being endless and mounted for movement within said flanges with the loops of the tapes passing over both sides of said web; a guide, means mounting said guide for longitudinal movement along said rod; and a flexible duct interconnecting the lower ends of said reservoir and said transparent tube.

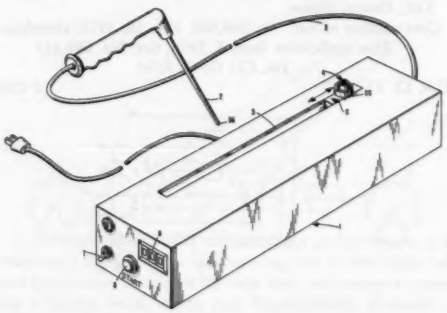
4,041,614
CLOTHES DRYER
Norman A. Robinet, 404-6505 Huntridge Hill NE., Calgary, Alberta, Canada (T2K5E5)
Filed July 12, 1976, Ser. No. 704,321
Int. Cl.[2] F26B *21/10*
U.S. Cl. 34—92 **5 Claims**

5. A clothes dryer comprising:
a stationary housing;
a horizontal shaft fixedly mounted within said housing;
a rotatable double drum with imperforate exterior wall portions journaled on said shaft;
said double drum having an interior compartment with perforate wall portions for holding clothes and a peripheral space about said interior compartment defined by said perforate wall portions and said exterior imperforate wall portions;



means for sealably closing said double drum; and
pump means mounted on said horizontal shaft having a rotor rotatable with said double drum and in communicating relation to the interior of said double drum for exhausting air and water vapor from said double drum.

4,041,615
SMALL-MOTION TEST DEVICE
Joseph Whitehill, R.D. 3 Box 278A, Chestertown, Md. 21620
Filed Aug. 3, 1976, Ser. No. 711,296
Int. Cl.[2] G09B *19/24*
U.S. Cl. 35—13 **10 Claims**

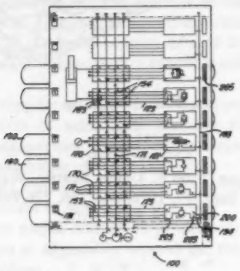


1. A small-motion test device for testing the hand-eye coordination, correction reflex, and small-motion muscle control of a test subject comprising
a target
means for moving said target along a path at a predetermined rate,
switch means coupled to said target for defining boundaries of a multi-dimensional envelope of freedom of movement of said target,
a wand controlled by said test subject to affirmatively position said target within the boundaries of said envelope of freedom of movement during travel of said target along said path, and
means responsive to said switch means for indicating the location of said target within said envelope of freedom of movement.

4,041,616
CIRCUIT DESIGN APPARATUS

Victor Hugh Hamblett, Worthing, England, assignor to B & G Hydraulics Limited, Worthing, England

Filed July 13, 1976, Ser. No. 704,850
Claims priority, application United Kingdom, July 14, 1975, 29505/75
Int. Cl.[2] G09B *23/06*
U.S. Cl. 35—19 R 12 Claims

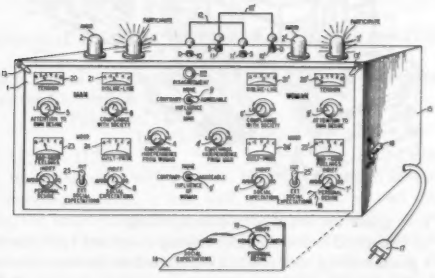


1. Apparatus for representing the connections between a plurality of circuit components to be connected in a circuit and a multiplicity of flow lines in the circuit, the apparatus comprising a first member having a multiplicity of equally spaced lines thereon to represent the flow lines in the circuit, and a plurality of connection members slidably mounted on the first member at spaced positions along the flow lines, each connection member being marked with connection indicia which are spaced apart in a direction perpendicular to the flow lines on the first member by distances equal to the spacing of the flow lines on the first member, the arrangement being such that, in use, the connection indicia and the flow lines can be viewed simultaneously and sliding movement of the connection members relative to the first member is operable to bring different connection indicia on the connection members into register with flow lines on the first member to indicate which flow lines are required to be connected to components represented by respective connection members.

4,041,617
APPARATUS AND METHOD FOR INDICATION AND MEASUREMENT OF SIMULATED EMOTIONAL LEVELS

James Fisher Hollander, 40 Middlesex St., Matawan, N.J. 07747

Filed July 26, 1976, Ser. No. 708,560
Int. Cl.[2] G09B *19/00*
U.S. Cl. 35—22 R 70 Claims

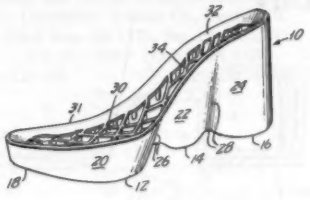


1. Simulation apparatus comprising
a plurality of sources of respective physical forces, at least one of said force sources being substantially continuously adjustable in level, said forces being relatable to levels of positive and negative decisional influences;
means for comparing said physical forces so as to determine whether a combined total of levels of at least two of said decisional influences is positive or negative in character; and
means for indicating one or more simulated emotions, each simulated emotion having a range of simulated emotional levels, by measuring as an emotion at least one of said physical forces including a force from at least one said adjustable force source in a manner dependent on the positive or negative character determined by said comparing means.

4,041,618
CONTOURED SOLE FOR HIGH HEELED SHOES

Joseph P. Famolare, Jr., Florence, Italy, assignor to Famolare, Inc., New York, N.Y.

Continuation of Ser. No. 710,097, July 30, 1976, abandoned, which is a continuation of Ser. No. 536,895, Dec. 27, 1974, abandoned. This application Oct. 1, 1976, Ser. No. 728,603
Int. Cl.[2] A43B *13/00*
U.S. Cl. 36—25 R 3 Claims



1. A substantially flexible solid appearing sole for high heeled shoes comprising
a. solid side, end and bottom walls defining an internal cavity;
b. a web disposed in said cavity comprised of a plurality of criss crossed, relatively thin walls defining a honeycomb construction, said web walls being integral with said side, end and bottom walls;
c. the outer surfaces of said side and bottom walls defining a plurality of juxtaposed alternating curves and troughs, said alternating curves of the side and bottom walls forming a compound-curved structure therein;
d. a plurality of pairs of integral horizontal ribs disposed in said cavity, one each of each pair of said ribs disposed on each side of one of said web walls between the top and bottom edges thereof.

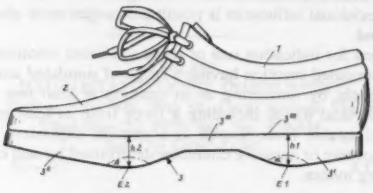
4,041,619
SHOE

Peter Sapper, Auf der Burg, D-7121 Walheim, Wurttemberg, Germany

Filed Feb. 9, 1976, Ser. No. 656,635
Claims priority, application Germany, Mar. 21, 1975, 2512419
Int. Cl.[2] A43B *13/00*
U.S. Cl. 36—25 R 9 Claims

1. A shoe comprising an upper and a sole, the sole including a sole body having upper and lower surfaces, the shape of the sole body, as viewed from above, being approximately that of the foot of a wearer, a front portion, an arch portion and a heel portion of the sole, two downwardly extending projections extending across the width of the lower surface of said sole body, the projections being produced by variations in the thickness of the sole body, the first of said projections being located under the heel portion of the sole body adjacent the arch portion and the second of said projections being located under the front portion at the location of the ball of the foot of

the wearer, the projections being of substantially equal height from said upper surface, the upper surface of the sole body in



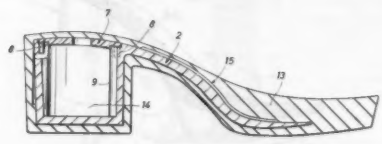
the arch and heel portions being curveless in the longitudinal direction and having a longitudinal axis in said portions extending in a horizontal plane.

4,041,620

INTEGRATED SHOE SOLE AND HEEL

Victor F. Anderson, Wenonah, N.J., assignor to Shell Oil Company, Houston, Tex.

Filed Aug. 27, 1976, Ser. No. 718,232
Int. Cl.[2] A43B *13/04*
U.S. Cl. 36—32 R **7 Claims**



1. An integrated shoe sole and heel article comprising:

a. an integral heel and shank insert formed from a thermoplastic polymer wherein

i. the heel portion comprises a hollow body part having a bottom and sides, the lower portions of which sides are continuous with the bottom and the upper portions of which sides bound an opening at the heel-seat area of the heel portion; and

ii. the shank portion is continuous with the upper portion of the heel portion;

b. a heel-seat part closing the opening of the hollow body part of the heel portion, said heel-seat part being bonded to the heel portion and said heel-seat part having a means to suspend the integral heal and shank insert with attached heel-seat part in a unit sole mold; and

c. a unit sole formed from a thermoplastic elastomeric composition, said unit sole encompassing the integral heel and shank insert with attached heel-seat part.

4,041,621

SNOWSHOE AND METHOD OF FABRICATING SAME

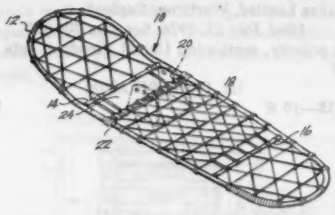
Richard Marlow Anderson, P.O. Box 211, Black Diamond, Wash. 98010

Filed Nov. 15, 1974, Ser. No. 524,235
Int. Cl.[2] A43B *5/04*; A43D *9/00*
U.S. Cl. 36—122 **10 Claims**

1. A light, flexible snowshoe including a frame comprising a toe piece and a heel piece joined at points laterally adjacent the foot mounting position by jointer section means fixedly mounted on said toe piece and slidable with respect to said heel piece;

transverse support rod means slidably mounted within holes in said toe and heel pieces, the support rod means associated with said toe piece extending through a part of said jointer section means to fixedly hold said jointer section means with respect to the toe piece; and

web means secured to and covering said frame to hold all said pieces in engagement with each other.

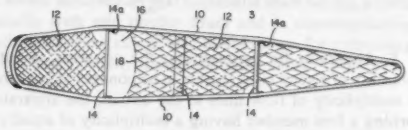


4,041,622

SNOWSHOE

David M. Schonbrun, 1100 E. Union, Seattle, Wash. 98122

Filed Sept. 27, 1976, Ser. No. 726,995
Int. Cl.[2] A43B *5/04*
U.S. Cl. 36—124 **4 Claims**



1. A lightweight snowshoe providing good traction for the wearer over lever and inclined terrain comprising:

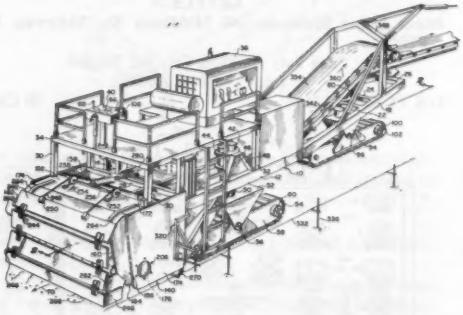
longitudinally extending spaced frame members joined together enclosing an area criss-cross by webbing, the frame member being of a configuration which is substantially rigid against bending along its major axis and flexible along its minor axis, the frame member further provided with sharp lower edges which penetrate the snow to prevent lateral slippage when traversing sloping terrain.

4,041,623

GRADE CUTTING MACHINE

David J. Miller, and Charles P. Miller, both of McHenry, Ill., assignors to Miller Formless Co., Inc., McHenry, Ill.

Filed Sept. 22, 1975, Ser. No. 615,767
Int. Cl.[2] E02F *5/00, 3/76*
U.S. Cl. 37—108 R **14 Claims**



1. A grade cutting machine comprising:

an elongated frame member having front and rear portions;

a grade cutting tool rotatably mounted on an axis transverse the front portion of said frame member and adapted to deposit loosened earth cutting therebehind;

a moldboard carried by said frame member and having its lower edge extending transverse said frame member and

spaced behind said cutting tool to grade said loose cuttings;

means adjustably and vertically supporting the opposite ends of said moldboard from said frame member whereby the elevation of the lower edge of said moldboard in relation to said cutting tool is variable and defines the depth of the layer of loose cuttings deposited upon said grade;

conveyor means having its receiving end in open communication with the loose cuttings graded by said moldboard to remove said cuttings to the rear of the machine;

a pair of ground engagement means disposed adjacent opposite sides of the front portion of said frame member to accommodate transportation of said machine along a path of travel;

front frame support means connecting opposite sides of said front portion of said frame member to the respective ground engagement means and adapted to adjustably support said frame member thereon;

single ground engagement means disposed from the rear central portion of said frame member;

frame support means connected to said rear ground engagement means to adjustably support the rear portion of said frame member;

actuating means supported by said frame member and responsive to an exterior grade reference disposed along said path of travel to be traversed by said machine, said actuating means being operatively connected to said pair of front frame support means whereby to extend and retract same silumtaneously for grade control;

actuating means supported by said frame member and operatively connected to said pair of front frame support means whereby to extend and retract same independently for slope control;

sterring means operatively connected to said single ground engagement means to turn said single ground engagement means on said vertical steering axis;

actuating means operatively connected to said steering means and responsive to the direction of said exterior reference to maintain said machine along said path of travel;

independent drive means for said front pair of ground engagement means and said single ground engagement means; and

means connecting said drive means for said pair of front ground engagement means to said steering means for said single ground engagement means whereupon actuation of said steering means induces a change in the driving speed between said front ground engagement means such that the front ground engagement means on the outside of a curve is driven faster than the front ground engagement means on the inside of a curve by a differential inversely proportional to the radius of said curve.

4,041,624

INTEGRAL RIPPERS FOR HYDRAULIC EXCAVATOR BUCKET

Max Dennis Fryrear, Joliet, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 17, 1974, Ser. No. 461,608

Int. Cl.[2] E02F *3/76*

U.S. Cl. 37—117.5 **10 Claims**

1. In combination with a bucket having a front end adapted for scooping material, a rear wall, and first and second sidewalls, the improvement comprising a ripper shank positioned between the first and second sidewalls and forwardly of the rear wall and adjacent the rear wall, and extending from the bucket along the rear wall generally parallel thereto through an opening defined by the bucket rearwardly of the front end adapted for scooping material, and guide means associated with the bucket, thr ripper shank being movable along the guide means to a first position extended relative to the bucket, and a second position retracted relative to the bucket, and means associated with the guide means and ripper shank for

holding the ripper shank in said first position and in said second position.

4,041,625

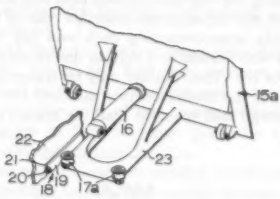
GUIDE RAIL ASSEMBLY FOR THE EJECTOR OF A SCRAPER AND METHOD

George A. Fisher, and Warner G. Richardson, both of Joliet, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 20, 1976, Ser. No. 752,709

Int. Cl.[2] B60P *1/36;* **E02F** *9/28*

U.S. Cl. 37—126 AE **17 Claims**



1. In a scraper of the type comprising a bowl structure, an elongated guide rail assembly secured on said bowl structure, an ejector assembly reciprocally mounted on said bowl structure for reciprocal movement thereon, and a guide roller rotatably mounted on said ejector assembly and engaging said guide rail assembly for guiding reciprocal movements of said ejector assembly on said bowl structure, the invention wherein said guide rail assembly comprises an elongated guide rod having a first cross sectional area and a pair of elongated locating rods disposed on either side of said guide rod and each having a second cross sectional area substantially less than said first cross sectional area and securing said guide rod to said bowl structure.

4,041,626

APPARATUS FOR PRESENTING READING MATTER AS A LINEAR BOOK

John Ellis, Dunmore East, County Waterford, and Liam Dunne, Sweetbriar, Tramore, County Waterford, both of Ireland

Filed Nov. 18, 1974, Ser. No. 524,898

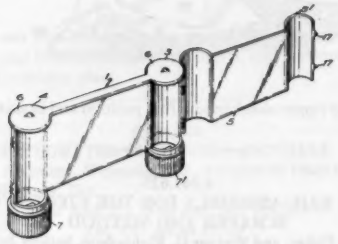
Claims priority, application United Kingdom, Nov. 28, 1973, 55050/73

Int. Cl.[2] B65H *19/02*

U.S. Cl. 40—86 R **3 Claims**

1. Apparatus for presenting reading matter on the two sides of a web of paper or the like comprising a holder having a substantially rectangular body member of transparent rigid plastics material provided at opposite ends with part-cylindrical hollow end members, a closure having a substantially rectangular body of transparent rigid plastics material provided at opposite ends with part-cylindrical hollow end members, means pivotally connecting one of said closure end members

with one of said body end members whereby said closure may be moved between a holder open position and a holder closed position wherein said transparent body members are in opposed adjacent relation to define a narrow space between them and said end members cooperate to define parallel cylindrical chambers at opposite ends of that space, spindles upon which opposite ends of said web are secured, each of said holder body end members having one lateral open-mouthed end, each of said spindles having an end extended through its body member open-mouthed end, and means detachably rotatably mounting said spindles in the body end members comprising a pair of



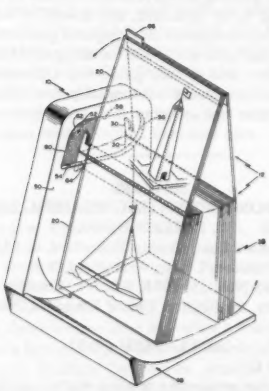
caps, closing each open-mouthed end, means formed on each said cap and the periphery of its corresponding open-mouthed end of one of said holder body end members for freely, rotatably mounting the cap thereon, and coacting interfitting means on said caps and the adjacent extended ends of the spindles for non-rotatably interconnecting each said cap with a spindle, whereby a web wound as a roll on one of said spindles in the chambers of the closed holder may be traversed through said space to read the matter on one side and then reversely traversed through said space to read the matter on the opposite side.

4,041,627

SEQUENTIAL DISPLAY DEVICE

George F. Lyman, Weston, Mass., assignor to Data Packaging Corporation, Cambridge, Mass.

Filed Dec. 19, 1975, Ser. No. 642,298
Int. Cl.[2] G09F *11/12*
U.S. Cl. 40—97 **9 Claims**



1. A device for presenting a series of photographs or the like in endless sequence comprising:

a plurality of generally flat, substantially rectangular panels hinged together, edge-to-edge in an endless sequence, said panels being hinged in a manner to enable all but two of the panels to be arranged in a pack of accordian-like configuration, said two remaining of said panels defining a self-supporting, V-shaped configuration and extending away from the pack in a display position;

each of the panels having an inner edge, an outer edge and a pair of side edges, the inner edges of adjacent panels being hinged to each other and the outer edges of adjacent panels being hinged to each other, hinges connecting the adjacent inner edges being constructed and arranged to enable the panels to be hinged in one direction and the hinges connecting the outer edgess of adjacent panels being constructed and arranged to permit hinging in the opposite direction, and

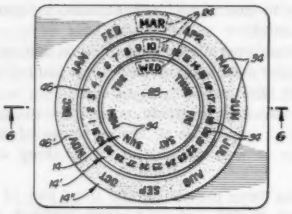
means for supporting the panels in a manner to enable said pair of panels to be pivoted toward an end of the pack and, in response thereto, to cause the leading pair of panels at the opposite end of the pack to be pivoted away from the pack and to be advanced to the display position.

4,041,628

APPARATUS FOR VISUALLY REGISTERING INDICIA

Eli Sasson, 605 N. Bedford, Beverly Hills, Calif. 90210

Filed Apr. 14, 1976, Ser. No. 676,786
Int. Cl.[2] G09D *3/06*
U.S. Cl. 40—111 **5 Claims**



1. For use in perpetual calendars and other uses to visually register indicia apparatus having rotatable members whereby relative rotation of the members visually registers indicia on one of the members, comprising:

a circular member having a supporting wall and a first top surface bridging the area between said wall,

said first top surface having an area of a first color, and interposed in said first color and of a lesser area, a second color distinct from said first color,

the area of said first color extending at least in a peripheral band around said first top surface spaced by said second color,

a circular cap rotatable on and overlying and surrounding the top and wall of the circular member, said cap having a second top surface having an area of said first color overlying said area of said first color on said circular member and extending at least in a peripheral band, there are a plurality of said circular members and said caps concentrically arranged, said plurality of circular members are joined and said caps are fitted to be independently rotated on respective circular members, and

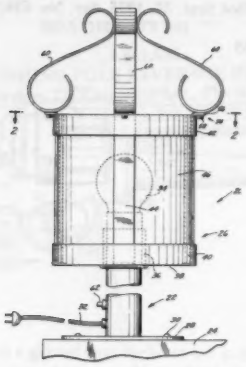
peripherally arranged transparent indicia formed in said second top surface in said area of said first color thereon whereby relative rotation of said members will cause a portion of said indicia to overlie and register with said second area of color to visually direct attention to said portion of said indicia the respective second areas of color are radially aligned.

4,041,629

SIGNAL DEVICE

Philip Hopp, New York, and Mort M. Allen, Bayside, both of N.Y., assignors to The Hopp Press, Inc., New York, N.Y.

Filed Apr. 13, 1976, Ser. No. 676,417
Int. Cl.[2] G09F *13/04*
U.S. Cl. 40—130 R 3 Claims



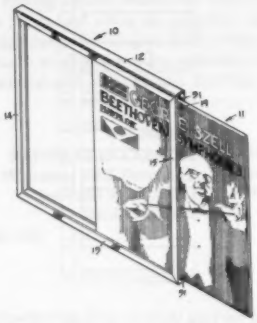
1. A signal device comprising; a support pole, a housing on the support pole, the housing being in the form of a cage with the bottom being disc-shaped and mounted to the top of the pole and having an upwardly extending annular skirt and the top being a circular band aligned with the annular skirt of the bottom, a plurality of spaced vertical ribs connected at one end to the bottom disc and at the other end to the circular band and the ribs being spaced to provide viewing apertures therebetween, means on the housing to removably receive and hold a a plurality of signal panels in position to be readily visually observable through the viewing apertures and being held in arcuate configuration so as to conform to the portion of the circular configuration of the housing where each panel is located, the panels being of deformable plastic material to facilitate their alteration of configuration to engage with the means on the housing in the desired position for visual observance through the appropriate viewing aperture, the panels being interchangeable and having predetermined indicia to enable the selection of a particular pattern to be observed while in the housing as a visual signal, the means on the housing to removably receive the panels includes a support bracket in alignment with each vertical member and attached to the housing at the location of the band, the bracket extending inwardly of the housing, each bracket cooperating with an adjacent bracket and the adjacent housing structure to receive a panel therebetween in deformed arcuate configuration and cooperate with the base of the housing to hold the panel in position for visual observance between the vertical members, a light source is mounted on the pole and positioned within the housing so as to illuminate the panels in position in the housing and enhance visual observance thereof from a distance, means being attached to the bottom of the pole to permit interconnection to a source of electrical energy to illuminate the light mounted at the top of the pole, the pole having support means to facilitate its ability to be placed in an upright position and the pole being of a predetermined length to position the housing when the pole is in the upright position in a high location to permit its visual observance from a distance.

4,041,630

FRAME FOR EXHIBITING ALBUMS AND THE LIKE

R. Patrick Holbrook, San Francisco, Calif., assignor to Album Frames Inc., San Francisco, Calif.

Filed June 1, 1976, Ser. No. 691,534
Int. Cl.[2] G09F *1/12*
U.S. Cl. 40—152.1 11 Claims



1. An open album frame for displaying record albums and the like comprising

an upper section,

a lower section disposed in parallel relationship relative to said upper section,

a first side section secured between first ends of said upper and lower sections,

means defining an elongated groove on an inner side of each of said upper, lower and first side sections with the grooves defined in each of said upper and lower sections intersecting opposite ends of the groove defined in said first side section to further define generally C-shaped composite mounting grooves,

a second side section disposed in parallel relationship relative to said first side section and secured between second ends of said upper and lower sections to define a rectangular album frame,

means defining an elongated slot through said second side section which extends substantially the full length thereof, opposite ends of said slot intersecting the grooves defined in said upper and lower sections whereby an album may be inserted through said slot and slid into the C-shaped composite mounting grooves defined in said frame for display purposes, and

a hanger having a pair of first and second parallel legs secured together by a bridging portion, said upper section having a rail partially defining the groove therein and wherein said first leg is disposed in the groove and has a vertical height substantially equal to the depth thereof, said bridging portion is disposed in underlying and supporting relationship relative to said rail and said second leg has a vertical height greater than the vertical height of said first leg and is substantially coextensive with respect to the vertical height of said upper section.

4,041,631

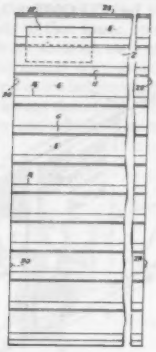
VISUAL DISPLAY BOARD OR PANEL

Arthur William Stevens, Courtdale House, Streete Court, Westgate-on-Sea, Kent, England

Filed Feb. 18, 1975, Ser. No. 550,862
Claims priority, application United Kingdom, Feb. 21, 1974, 7976/74
Int. Cl.[2] G09F *1/10*
U.S. Cl. 40—124.2 8 Claims

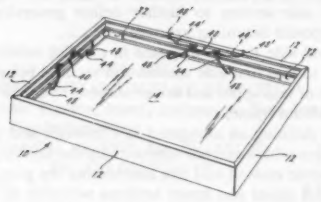
1. A visual display panel comprising a backing sheet and a plurality of generally parallel strips formed in one-piece therewith, each strip having two longitudinal edges and being inte-

grally joined to the backing sheet at a first one of said edges, the other edge being free and closely adjacent said backing sheet whereby a channel is defined between the backing sheet and the strip, said strips having been initially moulded inte-



grally with said backing sheet so as to jut outwardly therefrom and subsequently being deformed to bring their free edges adjacent said backing sheet and wherein each strip has a further fastening to the backing sheet.

4,041,632
ART FRAME
Robert Sarkisian, 4276 Stoneleigh Road, Bloomfield Hills, Mich. 48013
Filed Feb. 23, 1976, Ser. No. 660,703
Int. Cl.[2] G09F *1/12*
U.S. Cl. 40—156 **13 Claims**



1. An art frame for holding and displaying materials of substantially varying thicknesses, said frame having a plurality of corners and comprising

a plurality of frame sections forming a polygonal-shaped frame, each of said frame sections having a plurality of elongated channels formed therein,

frictional locking means positioned in each of said corners and adapted to securely hold two adjacent frame sections together, said frictional locking means being inserted in a first of said elongated channels in each of two adjacent frame sections,

brace means in each of said corners, said brace means being positioned in a second of said elongated channels in each of two adjacent frame sections,

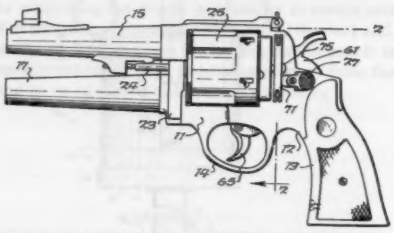
said first elongated channel and said elongated channel in each frame section being substantially perpendicular to each other, and

a plurality of spring members each comprising a body and at least one biased member extending therefrom, said body lying in a third of said elongated channels and said biased member being biased in a direction to securely hold said materials in place regardless of the thickness thereof,

said third elongated channel in each of said frame sections being in a plane substantially vertical to the plane of the display materials,

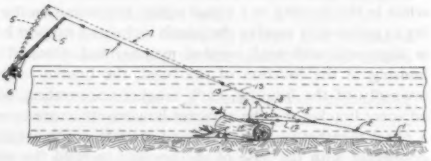
said biased member having a hooked portion at its outer end, said biased member and hooked portion being movable from a first position where said hooked portion is resting on said display materials holding them in place to a second position where said hooked portion is positioned on one of said frame sections allowing said materials to be inserted and removed from said frame.

4,041,633
DUAL-BARREL PISTOL
Pascal Scrufari, 457 12th St., Niagara Falls, N.Y. 14303
Filed Sept. 24, 1975, Ser. No. 616,139
Int. Cl.[2] F41C *1/00*
U.S. Cl. 42—65 **15 Claims**



1. In a pistol of the revolver type having a frame adapted for mounting a cylinder for holding cartridges, means for indexing said cylinder, a trigger, and a hammer interconnected with said trigger, the combination of two vertically spaced barrels with bores of different sizes, said barrels being attached to said frame; a rotatable cylinder carried by said frame having a plurality of chambers adapted to hold cartridges with bullets fitting each of said bores, said chambers being alignable with said barrels; a pair of firing pins carried in said frame, said firing pins being vertically spaced and adapted to fire cartridges in chambers of said cylinder aligned with said barrels; a hammer block engaging said firing pins and adapted to be struck by said hammer to produce firing of said cartridges; and barrel selecting means, movable with respect to said hammer block, for selectively preventing substantial movement of one or the other of said firing pins by said hammer block.

4,041,634
RELEASE OF FISHING HOOK
Anastacio Martinez, 2104 N. 39th St., Milwaukee, Wis. 53208
Filed Dec. 19, 1975, Ser. No. 642,477
Int. Cl.[2] A01K *97/00*
U.S. Cl. 43—17.2 **3 Claims**



1. A method of releasing a fishing hook snagged underwater to the far side of a submerged log or the like and where the hook is connected to relaxed fishing line, said method comprising:

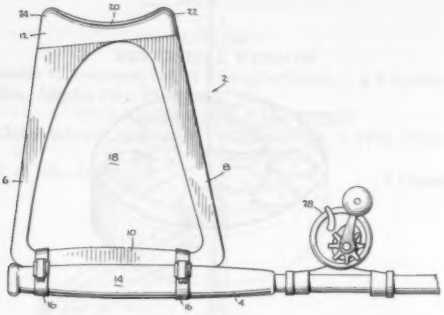
a. providing a heavy weight attached at one end to a stringer,

b. attaching the other end of said stringer to the fishing line so that the stringer is slideable therealong,

c. twirling said stringer to provide substantial centrifugal forces to said weight,

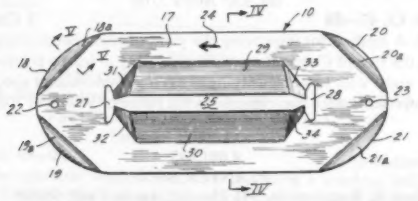
d. aiming said weight and releasing said stringer so that the momentum of the weight carries the latter generally horizontally through the air to the far side of said log where the weight drops downwardly into the water, and wherein said stringer follows said weight along the relaxed fishing line,
e. removing slack in said fishing line,
f. and yanking said fishing line rearwardly to cause said hook to releasably move in the opposite direction and toward said weight.

4,041,635
FISHING POLE LEVERAGE DEVICE
Robert M. Savage, 271 Carnation Ave., Floral Park, N.Y. 11001
Filed June 3, 1976, Ser. No. 692,468
Int. Cl.[2] A01K *87/00*
U.S. Cl. 43—25 **6 Claims**



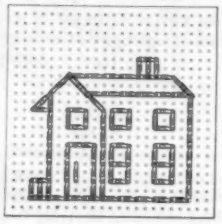
1. A leverage brace for reacting forces imposed on a fishing rod comprising:
a. a rigid column extending from the handle of the fishing pole to an upper surface;
b. an upper surface contoured to conform to the underarm of a fisherman; and
c. wherein the brace is formed of material having a lower density than water.

4,041,636
TROLLING ACCESSORY FOR FISHING
John F. Folker, 2615-17 N. Lakewood, Chicago, Ill. 60614
Filed Dec. 8, 1975, Ser. No. 638,645
Int. Cl.[2] A01K *85/00*
U.S. Cl. 43—42.31 **8 Claims**



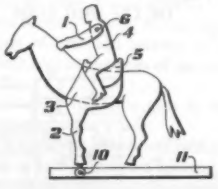
1. A fish attracting means for use with a fish capturing means such as a lure when said lure is drawn through a body of water comprising:
a flat rectangular body having attaching means at the front and rear portions thereof along the longitudinal axis of said body,
a rotation means carried by said body comprising plural upper and lower deflection surfaces on said front and rear portions and on opposite sides of the longitudinal axis of said body, said surfaces disposed at acute angles to the plane of the lure body to produce counterclockwise rotational moment, and
rotational drag reduction means to reduce a resistance to rotation comprising an elongated opening in a center portion of said body and along the longitudinal axis of said body having formed along one edge of said opening an upper flange and along the opposite edge a lower flange and each flange forming an acute angle to the plane of the lure body so that the water resisting rotation flows in a streamlined path through said opening.

4,041,637
PAPER CLIP CONSTRUCTION TOY
Robert S. Whitman, 6407 Beacon St., Pittsburgh, Pa. 15219
Filed June 9, 1975, Ser. No. 585,186
Int. Cl.[2] A63H *33/00*
U.S. Cl. 46—16 **3 Claims**



1. A game board for construction type games comprising a planar board member, a plurality of equally spaced generally perpendicularly projecting pegs all of substantially uniform height and cross section on one surface of said board, said pegs being located at the intersections of equally spaced apart sets of transverse parallel lines, said intersections and pegs being generally spaced apart so that a conventional paper clip spans at least two pegs in any straight line and a plurality of paper clips engaged over adjacent pegs to form a design, said adjacent pegs being frictionally engaged by said paper clips.

4,041,638
MODEL FIGURES
Robin Keith Knibbs, 18 Roman Road, Southwick, Sussex, England
Filed Nov. 28, 1975, Ser. No. 635,799
Claims priority, application United Kingdom, Nov. 28, 1974, 51539/74
Int. Cl.[2] A63H *11/10*
U.S. Cl. 46—127 **21 Claims**



18. A model figure representing a horse and rider, said figure including:
a. a base;
b. a first member representing a first portion of the rider and a first portion of the horse;
c. a second member mounted on said base and representing

a second portion of the rider and a second portion of the horse, and

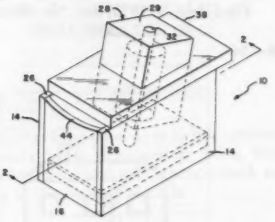
d. a pivotal connection between said first and second members, said pivotal connection being located within a part of the figure representing the rider and outside any part of the figure representing the horse.

4,041,639

GAME CALL WITH PEG GUIDED AT FIXED ANGLE TO STRIKING PLATE

Eldon E. Funk, R.D. No. 2, Newville, Pa. 17241

Filed Sept. 10, 1976, Ser. No. 721,955
Int. Cl.[2] A63H *5/00*
U.S. Cl. 46—189 **10 Claims**



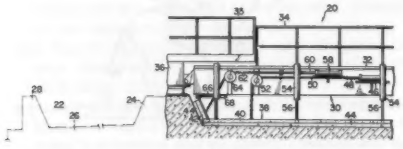
1. A game call of the type having a striking plate, supports on either side of the plate with edges parallel to the plate, a peg block having a bore extending inwardly from one end thereof with a vibratory peg centrally located in the bore extending from the closed end of the bore past the end of the block and having a rounded striking point at the free end thereof so as to produce a simulated call when moved across the striking plate, wherein the improvement comprises a stiffly resilient sound-insulating mounting strip resting on the edges of the supports above the striking plate, a central block-orienting opening extending through the thickness of the strip above the plate, the peg block being mounted within the opening with the striking point of the peg engaging the plate and with the block held by the strip at an angle of attack of less than 90° relative to the surface of the plate, whereby movement of the strip and block back and forth along the edges of the supports moves the striking point of the peg back and forth across the plate to produce a sound simulating a game call while the strip insulates transmission of sound between the block and supports.

4,041,640

CHLORELLA-CULTURING APPARATUS

Kojiro Itanami, and Masanori Ishizaki, both of Fukuoka, Japan, assignors to Chlorella Industry Co., Ltd., Tokyo, Japan

Filed May 5, 1976, Ser. No. 683,530
Claims priority, application Japan, Dec. 22, 1975, 50-151968; Mar. 1, 1976, 51-22021
Int. Cl.[2] A01G *33/00*
U.S. Cl. 47—1.4 **9 Claims**



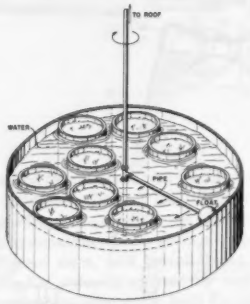
1. A chlorella-culturing apparatus comprising a circular chlorella-culturing tank defined by an outer inclined side wall and a bottom board, a pillar positioned at the center of said tank, at least one rotatable arm body supported upon said pillar and extending from the pillar to said tank side wall, a stirring mechanism fitted to the lower part of said arm body forcefully to produce stirring streams by stirring blades, and a scraping mechanism mounted on said arm body so as to slide up and down and, when the tank charge is drawn out, the scraping mechanism may be brought down to abut against the upper surface of said bottom board and the surface of said inclined side wall of said tank, thereby scraping off deposits collected on said surface.

4,041,641

PROCESS OF GROWING PLANTS WITHIN AN ENCLOSURE

Albert Louis Dietz, P.O. Box 5305, Santa Fe, N. Mex. 87501

Filed Aug. 8, 1975, Ser. No. 583,854
Int. Cl.[2] A01G *9/00*
U.S. Cl. 47—17 **4 Claims**



1. A novel growing unit comprising a walled enclosure, a predetermined portion of said enclosure being transparent to solar light, a circular water tank within said enclosure adapted to absorb said light and thereby provide a heat sink, a plurality of plant containers floating on the surface of said tank, and means extending from the exterior of said enclosure to the tank surface and being adapted to move said containers through a 360° path, at least a portion of which exposes said containers to the solar light.

4,041,642

PROCESS FOR IMPROVING THE YIELD OF SUGAR BEETS USING LOW INTENSITY LIGHT

Joel I. Krugler, Sudbury, and William F. Nelson, Weston, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed June 9, 1976, Ser. No. 694,264
Int. Cl.[2] A01G *1/00*
U.S. Cl. 47—58 **5 Claims**

1. A method for improving the yield of sugar beets comprising the step of illuminating the beets during at least a portion of the night with low intensity light having predominant spectral components with wavelengths in the range of 560nm to 700nm.

4,041,643

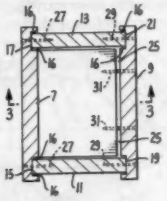
PLANTER BOX

Robert E. Sommerville, 541 Harriet, Aptos, Calif. 95063

Filed May 13, 1976, Ser. No. 686,180
Int. Cl.[2] A01G *9/02*
U.S. Cl. 47—66 **2 Claims**

1. A planter box having front and back members, said front and back members having deep dados therein and having side members fitting loosely into said dados to form a generally rectangular box-like member and nails passing from said front and back members at the centers of said dados into said side members, said nails holding said side members substantially in the center of said dados and a bottom for said planter box, said

bottom having an area substantially less than that encompassed by the front, back and side members, said bottom being located to leave gaps between the bottom and the two sides and the front, and being held in place solely with nails extending from



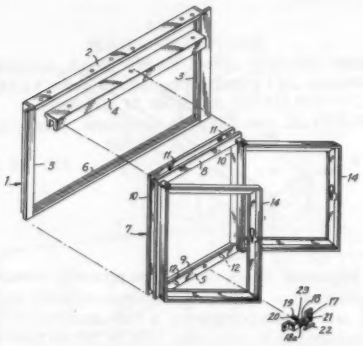
the front, bridging the gap between the bottom and the front and into the bottom whereby said bottom member can expand and slide over said nails without destroying the integrity of the planter box.

4,041,644

REVERSIBLE WINDOW

Eduardo V. Alcanzare, No. 16 Kamagong Street, L & S Subdivision, Angeles City, Philippines

Filed Sept. 8, 1976, Ser. No. 721,587
Claims priority, application Philippines, Oct. 7, 1975, 17633
Int. Cl.[2] E05D *15/50*
U.S. Cl. 49—163 **3 Claims**



1. A reversible window comprising a main frame, a movable frame disposed on said main frame and adapted to travel horizontally therein, and at least two identical sidewise swingable panels pivotally mounted on said movable frame, said swingable panels adapted to cover the entire space defined by the main frame.

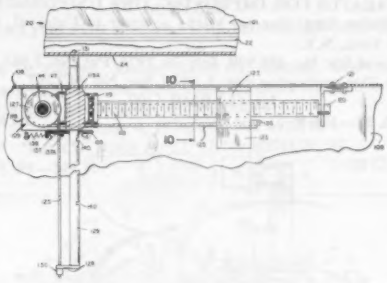
4,041,645

WINDOW CONTROL DEVICES

Jack T. Nourse, Rte. 1, Box 68C, Chisago City, Minn. 55013

Filed June 13, 1975, Ser. No. 586,633
Int. Cl.[2] E05F *11/04*
U.S. Cl. 49—347 **15 Claims**

1. An operable window assembly including a window unit, frame means for mounting said window unit for at least limited sliding movement in direction along said frame, a window unit operator mechanism comprising a screw mounted to have an axis generally parallel to the plane of the window unit, a screw follower, means acting between said screw follower and said window unit to cause movement of said window unit in a first direction when the screw is rotated and to permit movement of said window unit under gravity in a second direction including a cable member capable of carrying tension from said screw follower to said window unit, said cable being directly connected to said follower, a right angle gear drive means to drive said screw including a manual operator rotatable about an axis perpendicular to the plane of the window unit, and lock means



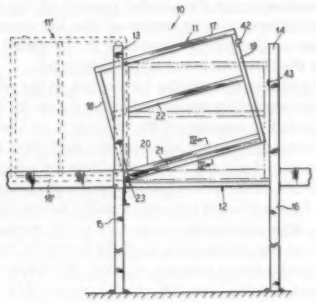
responsive to tension in the cable to lock said window unit against movement relative to said frame in said first direction when cable is slackened.

4,041,646

GATE

Douglas C. Mittag, Bolingbrook, Ill., assignor to Aurora Equipment Company, Aurora, Ill.

Filed Nov. 24, 1975, Ser. No. 634,503
Int. Cl.[2] E05D *7/00*
U.S. Cl. 49—385 **7 Claims**



1. A rotatable gate structure for a raised walkway entrance, comprising:

a. a raised walkway supported by a plurality of vertical support posts;

b. a railing alongside an edge of said walkway;

c. an entrance to said raised walkway at said edge defined by upward extensions of first and second of said vertical support posts which also define ends of the railing on each side of the entrance;

d. a rectangular vertically rotatable gate having first and second side members;

e. a hinge structure for vertical rotation of said gate connecting a lower corner of said gate to the upward extension of the first vertical post adjacent a surface of the walkway, the hinge structure positioning the gate such that the first side member of the gate is spaced inwardly towards the walkway from the first vertical post so that vertical rotation of the gate occurs alongside the first vertical post; and

f. locking means connecting said second side member of the rotatable gate to the upward extension of said second post for locking the gate and supporting the second side mem-

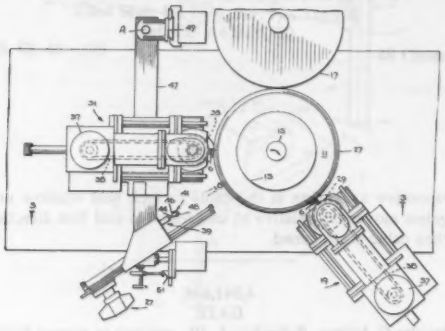
ber of the gate against horizontal forces directed toward the edge of the walkway.

4,041,647

APPARATUS FOR IMPROVING TIRE UNIFORMITY

John Walter Ugo, Warren, Mich., assignor to Uniroyal, Inc., New York, N.Y.

Division of Ser. No. 491,979, July 26, 1974, Pat. No. 3,963,427.
This application Jan. 7, 1976, Ser. No. 647,297
Int. Cl.[2] B24B *5/00*
U.S. Cl. 51—106 R 8 Claims



1. Apparatus for improving the uniformity of an inflated, pneumatic tire in a continuous operation while the tire is continuously rotating, comprising:

means for simultaneously and continuously measuring both the variation in the free radial run-out of the tire along both shoulders and the center of the tire tread and the variation in the forces generated in the radial direction around the circumference of the tire tread;

a pair of grinders electrically connected to the radial force variation measuring means and to the means for measuring the free radial run-out of the shoulders of the tire, said grinders being situated adjacent the shoulders of the tire and capable of moving to the shoulders for grinding either or both of said shoulders for correction of excessive variation in the free radial run-out or radial forces thereof; and

a third grinder electrically connected to the means for measuring the free radial run-out of the center of the tire, said third grinder being situated adjacent the center of the tire tread and capable of moving to the center of the tire tread for grinding said center for correction of excessive variation in the free radial run-out thereof.

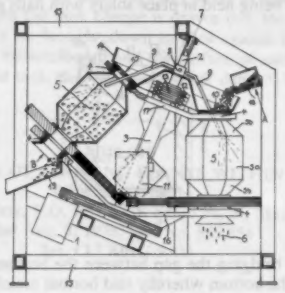
4,041,648

TUMBLING AND POLISHING MACHINE WITH PLANETARY ROTATING DRUMS

Ernst Heiberger, Winzingerstrasse 13, 7321 Reichenbach, Rechberg, Germany

Filed May 28, 1976, Ser. No. 691,063
Claims priority, application Germany, June 3, 1975, 2524566
Int. Cl.[2] B24B *31/02*
U.S. Cl. 51—164 7 Claims

1. In a tumbling and polishing machine including several planetary rotating drums for processing the surfaces and edges of workpieces by means of abrasive bodies in the drums, said drums comprising rotatable, driven, front end loading drums, means for mounting said drums on a rotor comprising two axially spaced discs, means for rotating said discs about a rotor axis on a fixed frame, the improvement characterized in that the rotating axes of the drums are inclined in the direction of their upper ends towards the rotation axis of the rotor, and the rotation axis of the rotor is inclined from the vertical such that the axes of the drums in the lowest position at any given time is approximately vertical, and wherein the drums are provided at their lower ends with an openable base door for emptying



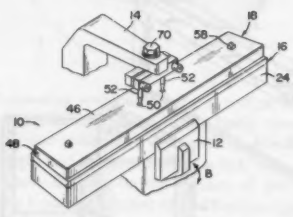
the drums and are apertured for the outflow of treatment and rinsing fluids.

4,041,649

ALIGNMENT DEVICE

Robert H. Stewart, Tampa, Fla., assignor to Practical Systems, Inc., Tarpon Springs, Fla.

Filed Nov. 15, 1976, Ser. No. 742,368
Int. Cl.[2] B24B *49/10*
U.S. Cl. 51—165.74 8 Claims



1. An alignment device of the type primarily intended for use in combination with an ophthalmic cylinder surfacing machine, said device comprising: a base member configured and dimensioned to be removably held by the lap table of said machine; and a top member including a plurality of apertures formed therein in corresponding relation to pins extending outwardly from the pin holder arm of said machine, whereby said top member may be positioned in contiguous, overlying relation to said base member; said base member comprising signal means mounted therein, said signal means including a plurality of first electrical contacts disposed on the surface of said base member; and a correspondingly positioned plurality of second electrical contacts disposed on the bottom of said top member, whereby said signal means will be actuated when all of said first electrical contacts mate with their corresponding second electrical contacts to indicate proper alignment of said ophthalmic cylinder surfacing machine.

4,041,650

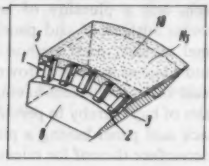
MATERIAL REMOVAL TOOL WITH MULTIPLE CUTTING EDGES

Wlodzimierz Sawluk, Hamburg, Germany, assignor to Ernst Winter & Sohn, Hamburg, Germany

Division of Ser. No. 385,478, Aug. 3, 1973, Pat. No. 3,898,772.
This application Aug. 6, 1975, Ser. No. 602,397
Claims priority, application Germany, Aug. 4, 1972, 2238387
Int. Cl.[2] B24D *7/18*
U.S. Cl. 51—206 R 9 Claims

1. In a rotary material removing tool, a combination com-

prising a base member having a peripheral cylindrical face and end face normal to said cylindrical face; a plurality of cutting elements projecting from one of said faces spaced in the direction of rotation of the tool from each other, each of said cutting elements comprising a cutting member composed of a homogeneous mass including crystalline particles of at least one material chosen from the group consisting of crystalline diamond particles and crystalline boron nitrate particles and constituting at least 80% of the volume of said mass, each of said cutting members having a single cutting edge of predetermined outline, and a connecting member integral with said cutting member and connecting the latter to said one face of said base member so that said cutting elements are uniformly distributed in said direction with said cutting edges spaced from and parallel to each other; and a continuous layer of grinding material covering the other of said faces.

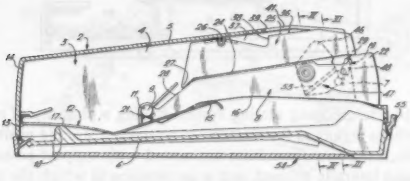


4,041,651

KNIFE SHARPENER

Peter Kingsley Bayly, Eltham North, Australia, assignor to Wiltshire Cutlery Company Proprietary Ltd., Australia

Filed Aug. 17, 1976, Ser. No. 715,003
Claims priority, application Australia, Aug. 22, 1975, 2893/75
Int. Cl.[2] B24B *3/54*
U.S. Cl. 51—214 **4 Claims**



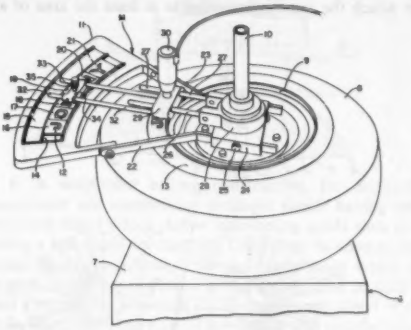
1. A knife sharpener including: a hollow enlongate housing having an access opening at a front end thereof; a carrier member located within said housing so as to extend generally lengthwise thereof and having a rear end portion pivotally connected to the housing at a location spaced rearwardly from said access opening, the axis of said carrier pivot extending transverse to the longitudinal axis of said housing so that pivotal movement of said carrier causes a front end portion thereof to be moved away from and towards an upper wall of said housing; a sharpening device mounted on said carrier front end portion adjacent said access opening; biasing means urging said carrier member to pivot towards said housing upper wall; and a reaction member at least partially located within said housing so as to be disposed between the upper surface of said carrier member and said housing upper wall and being pivotally connected to said housing for movement about an axis extending substantially parallel to said carrier pivot axis and which is located between the last said axis and said access opening; said reaction member having a rear section engaging said carrier upper surface at a location between the two said pivots, and a front end portion overlying that upper surface adjacent said access opening; the arrangement being such that a knife blade inserted into said housing through said access opening and engaging said sharpening device, causes separation of the front end portions of the two said members, but said rear section of the reaction member remains in engagement with said carrier member during the resulting pivotal movement of each of the two said members.

4,041,652

APPARATUS FOR ENGRAVING THE SIDEWALL OF A TIRE

Andrew A. Graven, Akron; David M. Ronyak, Copley, and Edward B. Bose, Stow, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed June 4, 1976, Ser. No. 692,812
Int. Cl.[2] B24B *19/22, 17/02;* B29H *21/02*
U.S. Cl. 51—241 R **20 Claims**



1. An apparatus used in the formation of indicia in the sidewall of a tire having a center axis, comprising:

a. means for supporting a tire and wheel rim on which the tire is mounted; to be formed in a sidewall of the tire mounted on the wheel rim, the indicia of the pattern having a traceable surface;

c. means, coacting with the tire and wheel rim supporting means, for mounting the pattern of indicia such that the indicia of the pattern are equally spaced from the center axis of the tire and wheel rim and the traceable surface of the indicia corresponds to the curved, outer surface of the sidewall receiving the indicia;

d. a stylus for tracing the indicia of the pattern;

e. a tool for grinding the indicia in the sidewall; and

f. means, coacting with said tire and wheel rim supporting means, for mounting the stylus and grinding tool for unitary corresponding radial and arcuate movement and any combination thereof, relative to the center axis of the tire and wheel rim.

4,041,653

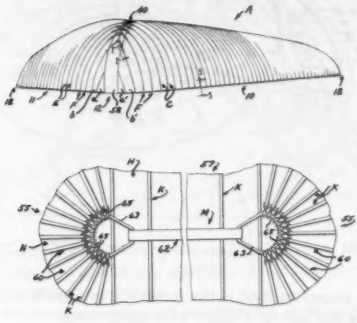
STRESS RELIEVED AIR SUPPORTED STRUCTURE

Lloyd H. Rain, Lexington, Ky., assignor to Irvin Industries, Inc., Stamford, Conn.

Filed May 27, 1976, Ser. No. 690,692
Int. Cl.[2] E04B *1/345, 1/347*
U.S. Cl. 52—2 **26 Claims**

1. An air supported structure having a wall portion including a plurality of relatively elongated panel members joined together by seam means; anchor means being provided along the base perimeter of said wall portion; said panel members including a membrane configuration defining at least an exterior volute surface along said wall portion, and having web means interconnected thereto along said seam means; said wall portion having a relatively elongate central portion provided with an end closure portion at each end thereof; said central portion including a plurality of said panel members, said web means of said seam means interconnecting said panel members of said central portion extending transversely about said central portion and being attached to said anchor means along the base perimeter of said central portion at opposed sides of said

central portion; crown harness means including an end harness means for each said end closure portion and ridge harness means; each said end closure portion including a plurality of said panel members, said web means of said seam means interconnecting said panel members of each said end closure portion being respectively attached to said anchor means along the base perimeter of an end closure portion and attached in situ as a part of an end harness means of such end closure portion; said ridge harness means extending along and adjacent the apex of said central portion, in an overlying and unattached relation to said panel members of said central section and being unattached to said panel members of each said end closure portion; each said end harness means being unattached to said membrane configuration and seam means of the end closure portion for which the same is provided at at least the area of attachment thereto in situ as a part of said web means of said end closure portion for which the same is provided and being unattached to said panel members of said central portion; wherein the radius of curvature of said panel members is a direct geometric function of the width and height of said air supported structure; wherein the loads in said crown harness are a function of the end closure means and end harness means in relation to the width and height of said air supported structure, the primary radius of curvature thereof, and the design wind speed and inflation pressure thereof; wherein the loads in said anchor means are a function of the loads in said seam means; and wherein the loads in said seam means are a function of the geometry of the respective portion thereof of which they are a part, the primary radius of curvature thereof, and the design wind speed and inflation pressure thereof.

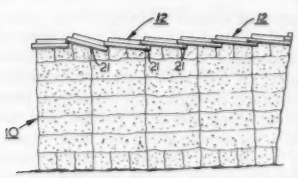


4,041,654

COVER FOR BALED HAY AND THE LIKE

Walter Nedila, Box 63, MacDowall, Saskatchewan, Canada

Filed May 13, 1976, Ser. No. 687,300
Claims priority, application Canada, Mar. 9, 1976, 247486
Int. Cl.[2] E04B *1/34;* B62D *63/04*
U.S. Cl. 52—3 **5 Claims**



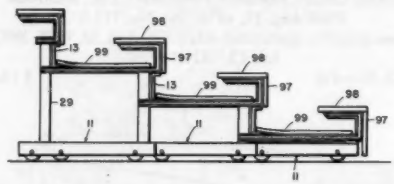
1. A panel adapted to form a part of a protective cover for a stack of bales of hay or the like, said panel being elongated in form and adapted to be disposed on top of and to span the stack of bales, said panel defining an opposed pair of longitudinal marginal edges having means thereon for engaging additional ones of said panels which, in use, are disposed in side-by-side overlapping relationship with one another thereby to cover the entire top of the stack, the engaging means on said opposed longitudinal marginal edges comprising an upwardly turned lip extending along one of said edges and a downwardly turned lip extending along the other of said edges whereby, in use, adjacent oppositely directed lips of the overlapping panels can interengage one another in such away as to prevent water from leaking therebetween, and a plurality of anchoring means connected to the under surface of said panel and extending away from the panel surface, each anchoring means being elongated in form and adapted to project downwardly into the stack of bales with said anchoring means having means thereon for engaging the bales of hay thereby to permit the panel to be anchored to the stack said panel having a plurality of means attached to the undersurface thereof for releasably connecting said anchoring means thereto, said means for releasably connecting the anchoring means to the panel comprising spaced apart recess defining means constructed so as to permit the anchoring means to be slidably inserted thereinto and adjusted to and fro in a direction parallel to the panelundersurface.

4,041,655

TELESCOPING SEATING SYSTEMS

Vincent Anthony Pari, Muskegon, Mich., assignor to Universal Bleacher Company, Champaign, Ill.

Filed July 26, 1976, Ser. No. 708,607
Int. Cl.[2] E04H *3/12*
U.S. Cl. 52—9 **22 Claims**



1. In a telescoping seating system having a plurality of row assemblies arranged for movement between a storage position in which the row assemblies are nested with support posts or columns laterally aligned, and a use position in which the row assemblies are extended from front to rear and in stepped relation, each row assembly comprising: a pair of laterally spaced floor-engaging carriage means, a post fixed to each carriage means and extending upwardly therefrom, deck means; means for connecting said deck means to a pair of posts for each row; said system characterized in that said posts are inclined relative to the vertical on each side of said system such that the center span between deck/post connections for a plurality of said row assemblies is the same.

4,041,656

DEVICE FOR PREVENTING ICE FORMATION ON A ROOF

Ralph Anderson, 665 Kallstrom Road, Cloquet, Minn. 55720

Filed June 17, 1976, Ser. No. 697,223
Int. Cl.[2] E04D *13/00*
U.S. Cl. 52—16 **9 Claims**

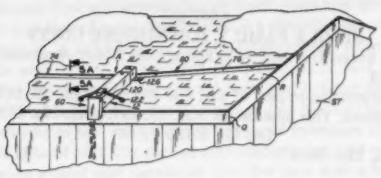
1. Device for draining melted snow from a roof comprising:

a. a collector tube having spaced sidewalls joined by a top and a bottom wall and open at both ends,

b. an elongated screen member mounted in said tube and spaced from the bottom wall of said tube adapted to contain

c. ice melting material thereon, and

d. means extending substantially laterally from said tube for directing melted snow to one end of the tube for travel



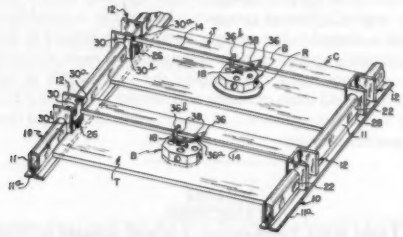
under said screen upon said bottom and out the other end of said tube.

4,041,657

FIXTURE SUPPORT FOR GRID TYPE CEILING

Jerome T. Schuplin, Parma Heights, Ohio, assignor to Fastway Fasteners, Inc., Lorain, Ohio

Filed Sept. 18, 1975, Ser. No. 614,690
Int. Cl.[2] E04B 5/52
U.S. Cl. 52—39 20 Claims



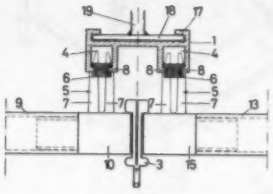
1. A fixture support for use on a grid type ceiling structure which includes spaced generally parallel grid elements of inverted T-shaped configuration in vertical cross section, comprising one piece clips for mounting in supported relation on the vertical web of respective spaced grid elements, means on said clips for mounting a bridging bar therebetween, a bridging bar for coaction with the last mentioned mounting means and adapted to bridge the associated clips, each of said clips having means for releasably gripping the respective grid element to hold the clip on the respective grid element, said gripping means including a resilient tongue adjacent the lower portion of each clip with the latter being adapted to be forced down over the associated grid element whereby said tongue will grip the vertical web of the respective grid element, and means adapted for coaction with said bar for suspending a fixture therefrom, said last mentioned mounting means providing for varying the vertical position of said bar and thus the vertical position of said suspending means with respect to said clips, and comprising a plurality of vertically spaced openings, a selected one of said vertically spaced openings in each clip adapted to receive a corresponding end of said bridging bar therein for supporting said bridging bar between said associated clips, the ends of the bridging bar being readily insertable into and removable from said selected opening in the respective clip.

4,041,658

CEILING EQUIPMENT FOR DEMONSTRATION EQUIPMENT

Jean-Pierre Cuvilly, Chennevieres-sur-Marne, Germany, assignor to E. Kalinna, Germany

Filed May 5, 1975, Ser. No. 574,707
Claims priority, application Germany, May 7, 1974, 2425633
Int. Cl.[2] G09F 7/20
U.S. Cl. 52—39 6 Claims



1. A suspended ceiling construction for demonstration equipment and comprising rectangle panels having mutually adjacent edges which define intersecting guide slots in which slides a link chain for carrying samples to be shown, said link chain having a laterally enlarged upper head which is supported on the upper surface of the panels close to their edges, and a supporting structure for the panels composed of parallel rails which each have on its lower side two parallel longitudinal undercut channels facing downwardly, clamping elements arranged on the panels in spaced relationship along the edges thereof parallel to said rails and channels and extending upwardly from the upper surfaces of the panels to be snapped into the undercut channels, said clamping elements being spaced from the edges of the panels to leave space for the head of the link chain, the distances between the channels of one rail and of each clamping element from the edge of the associated panel being such that the slots between the edges parallel to said rails of adjacent panels will be maintained at a width sufficient to accommodate the link chain, and spacing pieces in the longitudinal channels between the clamping elements of adjacent panels to determine between the edges, normal to the longitudinal channels, of adjacent panels a slot for accommodating the link chain.

4,041,659

METAL BUILDING STRUCTURE

Hubert L. McElhoe, 1426 Brazos St., Graham, Tex. 76046

Filed Sept. 15, 1975, Ser. No. 613,252
Int. Cl.[2] E04B 7/02
U.S. Cl. 52—93 7 Claims

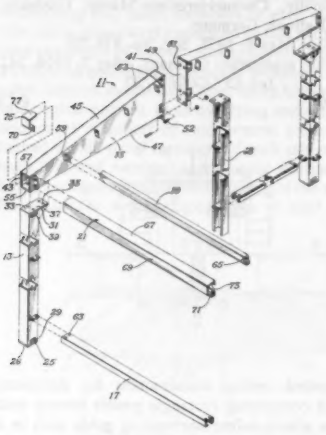
1. A metal building structure comprising:

pairs of spaced upright columns, each column having a rectangular transverse cross section of uniform size throughout its length;

pairs of rafters, each rafter having an outer end carried by one of the columns and connected to its mating rafter intermediate the columns to form a double pitched roof support; each rafter having a rectangular transverse cross section that increases in height from the outer end to the inner end; each rafter having a quadrilateral vertical cross section with parallel outer and inner ends, a bottom side perpendicular to the ends, and a top side at an acute angle with respect to the bottom side equal to a desired roof slope; the rafter's bottom side being substantially perpendicular to the longitudinal axis of the column; the bottoms of said rafters being co-planar and when installed lying in a flat, substantially horizontal plane facilitating installation of a ceiling;

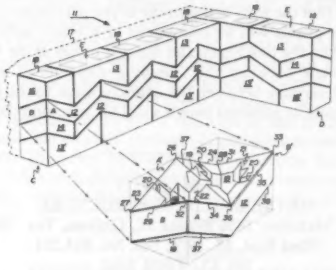
a plurality of purlins fastened transversely between each pair of rafters, with the top side of each purlin substantially flush with the top side of the rafter; and

a plurality of girts fastened transversely between each pair of columns, with the sides of the girt substantially flush with



the sides of the column so as to be co-planar therewith and facilitate installation of an interior wall.

4,041,660
SELF-ALIGNING BLOCKS
William A. Yensen, 5419 Central Ave., Bonita, Calif. 92002
Filed Jan. 29, 1976, Ser. No. 653,436
Int. Cl.[2] E04C *1/12, 1/30*
U.S. Cl. 52—100 **4 Claims**



1. A self-aligning construction block comprising:

a basic block having two flat vertical sides connected by two flat vertical end surfaces;

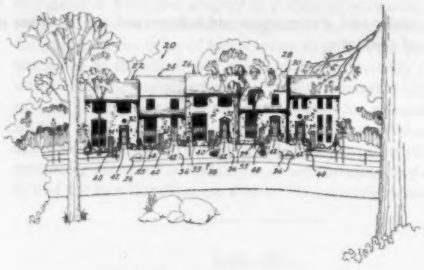
a top surface and a bottom surface, at least one of said top surface and bottom surface being a compound angled surface consisting of first, second, third, and fourth facets, said first and second facets having high points at two top corners of one of said two flat vertical sides, and low points at the top center of said one of two flat vertical sides, and two low points at the top corners of the other of said two flat vertical sides;

said third and fourth facets having a high point at the top center of said other of two said flat vertical sides and a low point at the top center of said one of said two flat vertical sides, and low points at the top two corners of said another of said flat vertical sides; and

first and second hollow wells extending from said top surface through said bottom surface to define a central divider section therebetween;

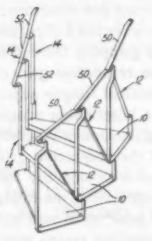
said divider section having a slot entrant therein from one of said surfaces and aligned essentially parallel to said sides to receive a portion of a steel reinforcing rod.

4,041,661
SINGLE FAMILY TOWNHOUSE UNITS
Myron Stuart Hurwitz, 4420 Forest Glen Court, Annandale, Va. 22003
Continuation-in-part of Ser. No. 151,858, June 10, 1971, abandoned. This application Aug. 25, 1975, Ser. No. 607,461
Int. Cl.[2] E02D *27/00*
U.S. Cl. 52—169.4 **32 Claims**



1. An improved townhouse unit of the type having a plurality of floors including ground and main or first floors which together define the living space for a single family therein so that there is interior communication for the family between all floors of the said townhouse unit and a front portion having a main entrance which includes at least a single door positioned at an intermediate location between said ground floor and said main or first floor for providing entrance into said main or first floor by way of a formal entrance wherein the improvement comprises a second entrance door horizontally spaced to side of and vertically spaced intermediately to said main entrance, said second door being substantially the same width as said single door in said main entrance said second door being fully exposed in said front portion and opening into the ground floor of said townhouse unit.

4,041,662
STAIRCASES
Donald Leslie Ward, Leigh-on-Sea, England, assignor to Wards Construction (Overseas) Ltd., Irish Town, Gibraltar
Filed May 20, 1975, Ser. No. 579,275
Claims priority, application United Kingdom, May 22, 1974, 22975/74; Nov. 18, 1974, 49895/74
Int. Cl.[2] E04F *11/00, 11/12*
U.S. Cl. 52—187 **20 Claims**



1. A kit from which a staircase can be constructed, said kit comprising a plurality of identical riser units each comprising a planar slab tread member and at least two associated bracket members, each riser unit being adapted to be secured in a predetermined relation to an identical riser unit, at least one bracket member of each riser unit comprising an elongated

member having a first planar part for supporting a tread, a side part extending normal to said first part from one end thereof, and a second part extending normal to the end of said side part at the end thereof away from said first part and in a direction to overlie said first part, said second part being shorter than said first part, first and second aligned holes extending through said first and second parts respectively in a direction parallel to said side part, a third hole in said first part spaced from said first hole and parallel to said side part, the axis of said third hole being spaced from said second part, said bracket having an extension from the end of at least one of said first and second parts away from said side part, whereby said extension lies on the same side of said first part as said second part, said extension having a third part parallel to said first part with a fourth hole aligned with said third hole, and a fourth part parallel to said third part with a fifth hole aligned with said second hole, said third part being spaced from said first part a greater distance than said second part, said third and fourth parts being spaced from said first and second parts by equal distances, said bracket member having adjacent said first part thereof at said third hole a first fixing point and adjacent said second part thereof at said second hole a second fixing point, adapted for fixing respectively to said second fixing point of another identical bracket member and to said first fixing point of another identical bracket member, said bracket member having adjacent said third and fourth parts thereof at said fourth and fifth holes respectively, third and fourth fixing points, said third fixing point being adapted for fixing to said fourth fixing point of an identical bracket member when the latter has the second fixing point thereof secured to said first fixing point of the bracket member in question, and said fourth point of the bracket in question being adapted for fixing to said third fixing point of an identical bracket member when the latter has the first fixing point thereof secured to said second fixing point of the bracket in question, said first, second, third and fourth fixing points of the bracket in question lying at the corners of an imaginary parallelogram, the holes of said first, second, third and fourth fixing points having axes parallel to the parallel sides of said parallelogram and extending perpendicularly through respective portions of said bracket.

4,041,663

REDUCING SOLAR RADIATION TRANSMITTANCE OF INSTALLED GLAZING

Renato J. Mazzoni, Tarentum, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed July 30, 1976, Ser. No. 710,031
Int. Cl.[2] E06B *3/28*
U.S. Cl. 52—203 **11 Claims**

1. A reglazed window installation having reduced solar radiation transmittance comprising:

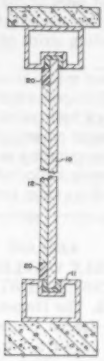
a building wall structure;

frame means connected to said building wall structure and outlining a vision opening, said frame means including a pane-edge-receiving channel;

an installed glazing unit which includes at least one transparent pane, said channel engaging edge portions of said glazing unit so as to retain said glazing unit in said vision opening;

an added transparent glass pane having height and width less than that of said vision opening and lying parallel to and in direct contact with a major glass surface on the exterior of said glazing unit, with the peripheral edges of said added pane spaced from said frame means, said added pane having visible light transmittance of no more than about 75 percent;

sealant disposed between the peripheral edges of said added pane and said frame means, said sealant being adhered to said added pane and to the adjacent surface of said glazing



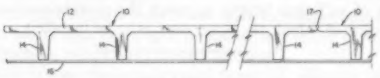
unit so as to provide adhesion and a moisture resistant seal therebetween.

4,041,664

JOIST, STRUCTURAL ELEMENT AND DEVICES USED IN MAKING SAME

George Bradley Davis, Jr., P.O. Box 1096, Boulder, Colo. 80302

Division of Ser. No. 400,381, Sept. 24, 1973, Pat. No. 3,919,824, which is a division of Ser. No. 256,257, May 24, 1972, Pat. No. 3,813,834, which is a continuation-in-part of Ser. No. 41,426, May 28, 1970, abandoned. This application Sept. 29, 1975, Ser. No. 617,737
Int. Cl.[2] E04B *1/41*; E04C *3/18*
U.S. Cl. 52—223 R **6 Claims**



1. A structural element having a fire rating of approximately 2 hours when tested with the standard time-temperature curve established by the American Standards for Testing Materials, said elements having first and second sides, said second side during the fire rating test of said element, being exposed to flames, said elements comprising:

a. at least one prestressed concrete-joists, each joist having
   i. a plate-like body portion forming at least a part of the first side of said element,
   ii. at least one integrally formed, reinforced support ledges disposed normal to the plate-like body portion, each support ledge having a bottom end,
   iii. each ledge having a nailing strip integrally molded centrally within the bottom end thereof, each nailing strip including a penetratable area formed internally adjacent thereof;

b. a plurality of sheets of material disposed adjacent the bottom ends of said ledges, said sheets being formed from a material selected from the group consisting of gypsum and a mineral fiber mixture, said sheets forming the second side of said element, the thickness of the material forming said sheets equalling at least one-half inch, each sheet of material forming at least one butt joint with an adjacent sheet, said butt joint extending longitudinally along the nailing strip within the bottom end of one of said ledges;

c. a plurality of metal channel-shaped members, each chan-

nel-shaped member being disposed along the length of each butt joint and intermediate said ledge bottom end and said sheets,

i. each channel-shaped member projecting laterally beyond the opposed sides of the nailing strip;

d. driven attachments means attaching said channel-shaped members to the nailing strips of said ledge bottom ends; and

e. additional attachment means attaching said sheets of material to said channel-shaped members laterally outward of the butt joint and of both sides of the nailing strip, said additional attachment means, channel-shaped members and nailing strips cooperating to secure the sheets to said joists while preventing undesirable distortion or warping thereof during the fire rating test.

4,041,665

INJECTION SEALABLE WATERSTOP AND METHOD OF INSTALLING SAME

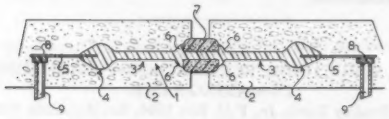
Eduard H. L. de Munck, The Hague, Netherlands, assignor to Vredestein N.V., The Hague, Netherlands

Filed Nov. 22, 1976, Ser. No. 744,100

Claims priority, application United Kingdom, Nov. 22, 1975, 48095/75

Int. Cl.² E04B *1/62;* **E04F** *15/14;* **E01C** *11/04*

U.S. Cl. 52—396 **9 Claims**



1. A water-stop composed of elastic deformable rubbery material for use in concrete structures which comprises a substantially flat middle portion and enlarged side wing anchor portions provided with sealing means, a pad of elastically-deformable sponge material being attached to one surface of at least of each side sealing means and attached to each said pad to as to be sealed thereby, and there being at least one injection tube of sufficient length to reach the outside surface of the concrete in which the water-stop is to be installed.

4,041,666

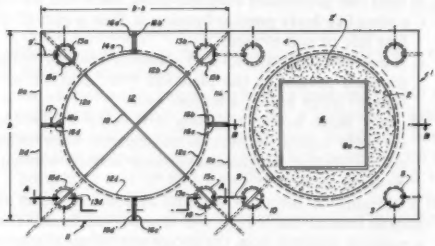
MODULAR CONCRETE BUILDING COMPONENTS FOR A LIGHT-WEIGHT STRUCTURE SYSTEM

Sargis E. Sargis, 19 Neive N. Jamshid-Abad, Tehran, Iran

Filed Dec. 4, 1974, Ser. No. 529,344

Int. Cl.² E04B *2/00*

U.S. Cl. 52—405 **3 Claims**



1. A modular building component for use in light-weight structural systems, comprising a substantially rectangular panel of concrete having transversely therethrough a relatively large central opening and a plurality of relatively small peripheral openings each disposed in, and significantly lessening the diagonal cross section of, a corresponding corner portion of said panel, said relatively large and relatively small openings being dimensioned so as to substantially reduce the weight of said panel while permitting effective distribution of forces due to vertical loads;

there being provided covers which overly at least a portion of said panel on both sides thereof to close said large opening;

at least some of the space of said opening between said covers being filled with heat-insulating material; and

said covers having a window therein defined by a frame formed by two mutually abutting portions which extend from said two corners, respectively, and retain said heat-insulating material in said large opening outwardly of said frame.

4,041,667

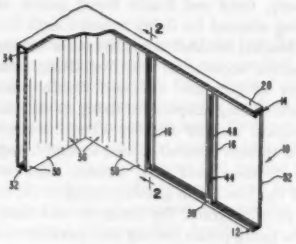
WALL ASSEMBLY

Robert L. Lindner, 225 Clyde Drive, Walnut Creek, Calif. 94598, and Luther E. Marshall, 21 Viewridge Road, Navoto, Calif.

Continuation of Ser. No. 262,860, June 14, 1972, abandoned, which is a continuation-in-part of Ser. No. 174,843, Aug. 25, 1971. This application Oct. 15, 1973, Ser. No. 406,446

Int. Cl.² E04B *5/52*

U.S. Cl. 52—483 **13 Claims**



1. In a wall assembly: a pair of members adapted to be disposed in generally upright positions; each member having an outer surface; and quick-release fastener means for interconnecting said members, said means including a first tape having an adhesive on its opposed faces and a second tape having an adhesive only on one face thereof, said first tape being movable into bonded relationship to said first member, said second tape being normally releasably bonded to the first tape and movable into bonded relationship to the second member with the bond between the second tape and the second member having a greater resistance to separation than the bond between the first and second tapes.

4,041,668

CLIP STRUCTURE FOR A CONCEALED GRID STRUCTURE OF A SUSPENDED CEILING

Martin D. Jahn, Riverside, and Glenn F. Balfanz, Jr., Western Springs, both of Ill., assignors to Chicago Metallic Corporation, Chicago, Ill.

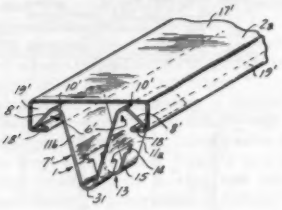
Filed Dec. 4, 1975, Ser. No. 637,724

Int. Cl.² E04B *5/52*

U.S. Cl. 52—489 **4 Claims**

1. A clip member for use in suspended ceiling structures utilizing panel-supporting grid runners of inverted T-shape in transverse cross-section, having a flat central vertical web portion terminating at its lower edge in oppositely directed outwardly extending flanges disposed in a common plane, adapted to receive and support the edge portions of cooperable ceiling panels, with such web portions terminating at its upper edge in a longitudinally extending bead having a transverse width greater than the thickness of said web to form a gener-

ally T-shaped upper edge portion, said clip member comprising a single piece of strip stock formed to provide an upper mounting structure and a lower runner-supporting structure integrally connected therewith, the runner-supporting structure comprising a pair of walls which are connected at their bottom edges, and extend upwardly therefrom in diverging directions with each wall having a notch therein of generally T-shaped configuration, aligned with one another, and each defining a relatively narrow leg portion having parallel edges spaced apart a distance slightly greater than the thickness of such a runner web, and opening in common at their connecting bottom edges, each notch, at the top thereof, having a relatively larger portion, communicating with said narrow leg portion, of a size to receive the bead of such a runner with such larger portion having a configuration generally complemental



to the cross-sectional configuration of such a bead, said larger portion having bottom edge portions extending laterally outward from the respective vertical edges of said narrow portion, disposed to engage adjacent cooperable portions of such a bead for supporting the latter and thereby such a runner therefrom, with the latter adapted to be interlocked with the clip by insertion of the bead of such runner in said larger portion and said web in said narrow portion, and relative sliding movement between the clip and runner, said mounting structure comprising two mounting portions, each extending downwardly and outwardly from the upper free edge of a corresponding wall of said pair to form a clip of generally M-shape in transverse cross section, with each of said mounting portions adapted to engage respective cooperable upwardly facing means of a support member of inverted C-shaped configuration.

4,041,669

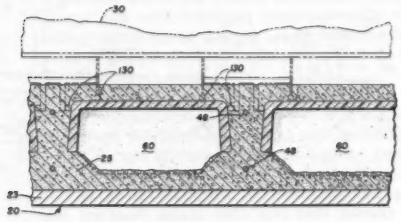
HOLLOW-CORE CONCRETE SLABS

Gerald A. Rauenhorst, 6817 Oaklawn Ave., Minneapolis, Minn. 55435

Continuation of Ser. No. 549,140, Feb. 12, 1975, abandoned. This application July 7, 1976, Ser. No. 703,198

Int. Cl.² E04C *1/00*

U.S. Cl. 52—576 **10 Claims**



1. A hollow-core concrete slab comprising an integral body of concrete and at least one foamed plastic core forming member positioned therewith so that concrete completely surrounds the core member at least along the length direction of said concrete slab, said core forming member being an integral structure of a top member having end, side and intermediate wall members extending at approximately right angles downwardly therefrom to define a plurality of recesses with open faces of a depth substantially equal to the height of said wall members to define voids in said slab which contains neither concrete nor foamed plastic.

4,041,670

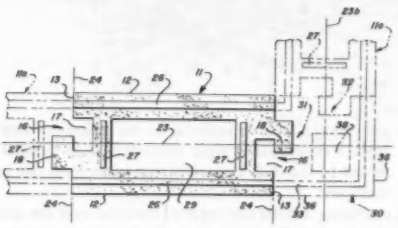
BUILDING BLOCKS

Richard D. Kaplan, 480 Park Ave., New York, N.Y. 10022

Continuation of Ser. No. 461,793, April 17, 1974, abandoned, which is a continuation of Ser. No. 214,791, Jan. 3, 1972, abandoned. This application July 30, 1976, Ser. No. 710,204

Int. Cl.² E04C *1/10, 1/30*

U.S. Cl. 52—591 **12 Claims**



1. A building block, including

i. a unit having a plurality of sides including a top, a bottom and an opposite pair of sides, and

ii. at least one integral complementary element symmetrically located with respect to a bilateral plane and adapted for effecting continuous weatherstops along said top and bottom sides when assembled with similar blocks, and

iii. an integrally formed unitary continuous self-jointing element on at least one side of the unit, said self-jointing element being complementary with similar elements on other blocks, comprising

a. an element inboard from a side wall, extending beyond said block and forming a doubled back male locking projection, which thus creates therewith,

b. a contiguous element inboard from the opposite side wall, recessed into said block, complementary with said element (a) and forming a doubled back female locking recess complementary with said formed male locking projection, the shape, area and volume of said formed male locking projection and said formed female locking recess being substantially equal, said continuous self-jointing element being capable of joining with a complementary substantially similar self-jointing element on a side of another building block, the formed male locking projection of each building block being capable of snug universal positive two-way interlocking relationship with the complementary formed female locking recess of each adjacent similar block, thus enabling said block to be selectively reversible around a vertical axis, and thus enabling each continuous self-jointing element to universally join with a complementary self-jointing element on another block in a positive two-way interlocking relationship without disturbing the continuity of weatherstops along said top and bottom sides when assembled with other similar blocks.

4,041,671

CONSTRUCTION METHOD

William I. Nicholson, 333 E. Hazel St., Inglewood, Calif. 90302

Filed Mar. 1, 1976, Ser. No. 662,359

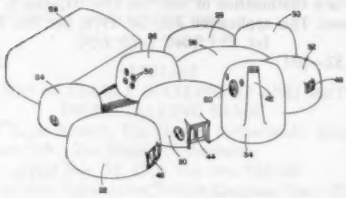
Int. Cl.² E04B *1/00*

U.S. Cl. 52—741 **40 Claims**

1. A method of forming building structures comprising:

a. providing a foundation;

b. placing a balloon having a shape substantially similar to part of the building to be formed over part of the foundation and inflating the balloon;
c. providing a layer of material on the balloon to form a substantially rigid construction form shell;
d. placing a balloon having a shape substantially similar to another part of the building to be formed over part of the foundation so that the base of the balloon is intersected by the shell formed in step (c);



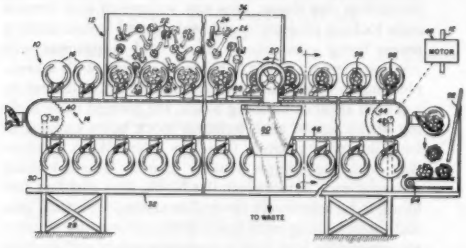
e. providing a layer of material on the balloon of step (d) to form a substantially rigid construction form shell intersected by the shell formed in step (c) to form one integral shell; and
f. providing at least one layer of material over the construction form shell, which when cured, will provide the structural shell of the building.

4,041,672

APPARATUS FOR BUNCHING BROCCOLI AND A METHOD THEREFOR

David L. Gularte, 1011 W. Alisal No. 4, Salinas, Calif. 93901

Filed July 26, 1976, Ser. No. 708,498
Int. Cl.[2] B65B *13/20*
U.S. Cl. 53—3 **18 Claims**



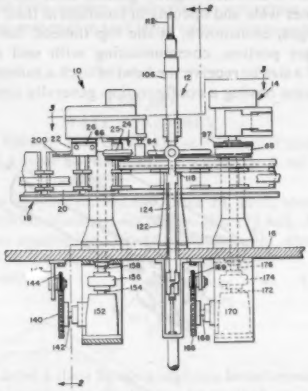
1. A method of forming vegetables with elongated stalks into bunches comprising:
providing a generally U-shaped holder;
driving said holder in a loop configuration;
placing a plurality of heads of vegetables into said holder with the stalks extending in generally the same direction;
clamping said stalks into a predetermined configuration;
removing portions of said stalks that extend beyond a predetermined length; and thereafter
inserting a band formed of an elastic material around said stalks while the stalks are clamped into a predetermined configuration to form the heads of vegetables into a bunch.

4,041,673

METHOD AND APPARATUS FOR FLATTENING AND SEALING POUCH TOPS

Arthur Alan Brooke, Toronto, and Rudy Loben, Westhill, both of Canada, assignors to Delamere & Williams Company Limited, Toronto, Canada

Filed Aug. 6, 1975, Ser. No. 602,219
Int. Cl.[2] B65B *7/06*
U.S. Cl. 53—39 **25 Claims**



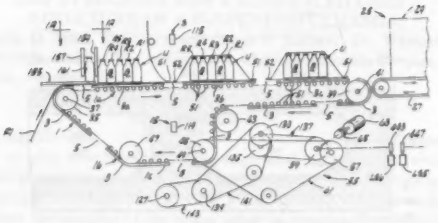
1. Apparatus for closing and sealing the open tops of filled pouches traveling along a predetermined path at a predetermined speed at a predetermined spacing comprising means spaced along said predetermined path for straightening the edge portions of the pouches, rendering the straightened edge portions adhesive and squeezing the adhesived edge portions to seal the tops wherein the means for straightening the edge portions comprise longitudinally spaced clamping jaws and coacting gripping rolls arranged to simultaneously grasp the trailing and leading ends of the pouches and means for moving the clamping jaws forwardly along said path, but at a lesser speed than the pouches are moved therealong and for rotating the coacting gripping rolls at a rate such that their surfaces are traveling faster than the pouches are moving along said path.

4,041,674

APPARATUS FOR PACKING ARTICLES, SUCH AS BOTTLES

Laurie M. Reid, Luthersville, Ga., assignor to Anderson Bros. Mfg. Co., Rockford, Ill.

Filed Jan. 26, 1976, Ser. No. 652,078
Int. Cl.[2] B65B *21/24, 35/40, 57/20*
U.S. Cl. 53—61 **16 Claims**



1. Apparatus for packing articles such as bottles in units with the articles in each unit arranged in parallel rows, each row comprising a plurality of articles arranged side-by-side, said apparatus comprising:
means for supporting articles for arrangement thereof in rows;

means mounting said supporting means for movement in a predetermined path generally at right angles to the length of the rows on said supporting means, said supporting means being movable forward along said path from a rearward retracted position;

a pusher for pushing rows of articles on said supporting means forward in said path generally at right angles to the length of the rows, said pusher being movable forward along said path from a rearward retracted position through a forward stroke and back through a return stroke to its retracted position;

a guide movable forward and back with the pusher and spaced forward of the pusher a distance such as to provide a space for a row of articles therebetween, said guide also being movable relative to the pusher between a lowered operative position at the level of the rows and a raised position above the rows;

means for feeding articles in single file one after another over said supporting means from one side of said path through said space when the pusher and guide are in their retracted position and the guide is lowered;

means for arresting the feeding of the articles to provide a row of articles on said supporting means in said space in a first position in front of the pusher;

means responsive to the arresting of feeding of the articles for driving the pusher and guide through a forward and return stroke whereby the pusher pushes the row of articles in front of the pusher forward to a second position and for simultaneously driving said supporting means forward through a predetermined forward stroke thereby to collate articles in rows on said supporting means;

means for moving the guide to its raised position so that, on its return with the pusher, the guide clears the articles in said second position;

presettable means for determining the number of rows of articles to be collated on said supporting means for a unit; and means responsive to said presettable means when it has determined the number of rows for a unit and the pusher and guide have been retracted and the guide lowered for retracting said supporting means to remove the support for the unit, the unit then being held against rearward movement by the guide.

4,041,675

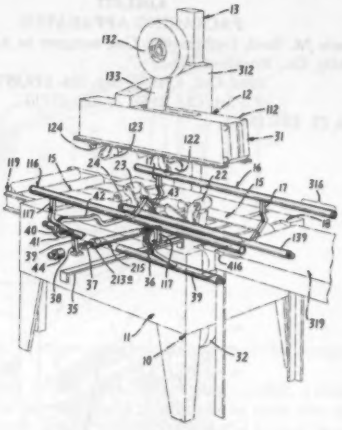
CARTON SEALING MACHINE CARTON SETTING UP AND LOADING EQUIPMENT

Winton Loveland, Fort Salonga, and Horst J. Hanemann, Manhasset, both of N.Y., assignors to The Loveshaw Corporation, Deer Park, N.Y.

Filed June 7, 1976, Ser. No. 693,200
Int. Cl.[2] B65B *57/00, 7/20*
U.S. Cl. 53—76 **7 Claims**

1. In a carton setting up and loading machine to facilitate an operator successively setting up in empty chamber-defining shape a plurality of cartons with their bottom closing flaps folded inward and loading their chambers to release them to the machine for sealing of their tops, comprising

1. a machine lateral bed having an entrance end and a discharge end with transport means laterally to move a loaded carton forward along a path from the former end to the latter end while sealing closed at least the folded top flaps thereof;
2. a carton setting up and loading lateral support preceding and adjacent to said entrance end of said machine bed;
3. a pair of substantially straight and parallel, laterally-extending and elongated, carton-clamping guidance side rails flanking opposite sides of the carton forward moving path to the discharge end and moderately elevated above said transport means with said rails initially separated transversely an appreciable distance intended successively to receive freely any of a number of the cartons of a width less than this distance of separation, said guidance rails having elongated entrance ends extending back from and preceding the entrance end of said machine bed and the transport means of the latter while overlapping a portion of said loading support;
4. means to move at least one of said guidance rails inward toward the other to snug their entrance ends against opposite sides of an intervening one of the cartons immediately preceding the entrance end of the machine while resting upon said loading support and with sufficient pressure as



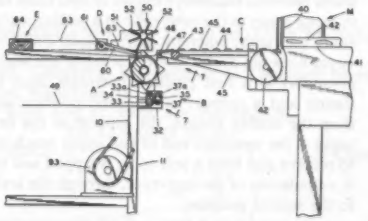
to hold the carton temporarily firmly upright with its top open for loading of its chamber; and
5. means to maintain said side guidance rails in their relatively inward carton snugging and guiding positions when the loaded carton is transported from said loading table into the entrance end of said machine bed for engagement by said transport means to move it forward past closure sealing means to the discharge end.

4,041,676

APPARATUS FOR PACKING STRIPS OF MATERIAL

James P. Smithers, Glen Ellyn, Ill., assignor to Armour and Company, Phoenix, Ariz.

Continuation of Ser. No. 458,764, April 8, 1974, which is a division of Ser. No. 262,656, June 14, 1972, abandoned. This application Aug. 28, 1975, Ser. No. 608,590
Int. Cl.[2] B65B *35/30, 63/00*
U.S. Cl. 53—123 **9 Claims**



1. In a machine for packing strips of material comprising a roll having steps on the surface thereof, said steps each having a forward side, a high point, and a rearward side, means for rotating said rolls so that the top of said roll moves in a direction forward of said machine and means for passing film over said roll in conformity with said steps while said roll is rotating, the improvement which includes a conveyor, said strips being in spaced relation on said conveyor, and in which said conveyor constitutes means for supporting, transporting and

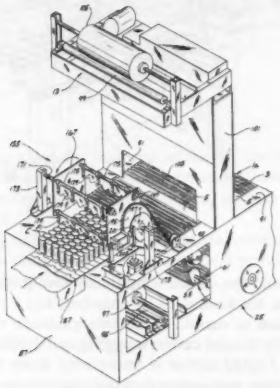
delivering separate strips of said material consecutively in said forward direction toward said roll until each of said strips is contacted by a high point of one of said steps which is coated by said film, whereby upon continued rotation of said roll each of said strips is brought in succession to rest on the film over the rear side of one of said steps.

4,041,677

PACKAGING APPARATUS

Laurie M. Reid, Luthersville, Ga., assignor to Anderson Bros. Mfg. Co., Rockford, Ill.

Filed Oct. 6, 1975, Ser. No. 619,897
Int. Cl.[2] B65B *11/08, 35/30*
U.S. Cl. 53—159 **2 Claims**



1. Sleeve-wrapping apparatus for wrapping units each consisting of a number of rows of products comprising

an endless main conveyor having a generally horizontal upper reach for transporting units forward along a generally horizontal path and a return reach below the upper reach, said conveyor comprising a series of supports each adapted to hold a unit spaced at intervals along and throughout the length of the conveyor with gaps between the supports,

means for intermittently indexing the conveyor forward through a distance equal to one of said intervals with a dwell between successive cycles of operation successively to bring a gap in the conveyor to a sealing station located along said path, whereby, during each dwell of the conveyor between cycles, there is a gap at the sealing station, a support at a first position upstream from the sealing station and a support at a second position downstream from the sealing station, the support at the first position being at the upstream end of said upper reach and adapted to receive and hold a unit to be wrapped and to transport it, on indexing of the conveyor, through the sealing station to the second position,

means for supplying a first web of heat-sealable wrapping material to extend over the support at the first position and under a unit on said first support as said first support and said unit proceed to the second position,

means for supplying a second web of heat-sealable wrapping material to lie on top of said unit as it proceeds to the second position,

means for sealing the two webs together at said sealing station and severing the webs through the seal to form a trailing seal for the webs draped around the unit at the second position and a leading seal for the unit at the first position, said sealing means being operable through the gap in the endless conveyor at the sealing station during each dwell of the conveyor,

means for feeding forward a series of rows of products in the direction toward said upstream end of the upper reach of the main conveyor, and

means operable during each dwell of the main conveyor for arresting the forward feed of said series of rows upstream from the upstream end of the upper reach of the main conveyor and operable upon indexing of the main conveyor to release the rows for forward feed thereof and to push forward a predetermined number of rows of products forming a unit onto a support of the main conveyor as it comes around and forward to its said first position,

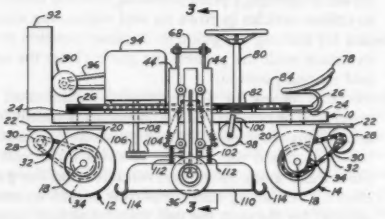
whereby, on each indexing of the main conveyor, a unit is moved from said first position through the sealing station to the second position for being wrapped, and another unit for the next cycle of operation is delivered onto the support of the main conveyor which comes to the first position.

4,041,678

SHORT TURN VEHICLE

Ray Owen Chaney, and Emsley M. Chaney, both of R.R. No. 2, Sidney, Ohio 45365

Filed Sept. 8, 1975, Ser. No. 611,399
Int. Cl.[2] A01D *35/26*
U.S. Cl. 56—10.7 **19 Claims**



1. A land vehicle comprising: a longitudinally extending frame having a longitudinally extending center line, front and rear power driven wheels generally on said center line and supporting said frame, means pivotally securing said wheels to said frame for rotation about generally vertical axes, a pair of stabilizer wheels respective ones of which are on opposite sides of said longitudinal center line, a rigid nonarticulated stabilizer frame extending transversely of said longitudinal frame and supporting said stabilizer wheels about axes fixed to said frame, and means biasing said rigid stabilizer frame downwardly relative to said longitudinally extending frame to hold the vehicle erect.

4,041,679

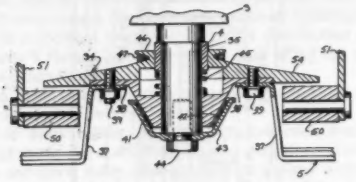
SELF-PROPELLED ROTARY LAWN MOWER

Lester H. Seifert, Kiel; Raymond P. Powers, Sheboygan, both of Wis.; William M. Schmidt, Grosse Point Shores, Mich.; Stanley E. Thorwaldsen, Grosse Point Farms, Mich., and Frederick W. Smith, Mount Clemens, Mich., assignors to Lester H. Seifert, Kiel, Wis.

Division of Ser. No. 438,589, Feb. 1, 1974, Pat. No. 3,890,772, which is a division of Ser. No. 289,539, Sept. 15, 1972, Pat. No. 3,802,170. This application Mar. 25, 1975, Ser. No. 561,985
The portion of the term of this patent subsequent to Apr. 9, 1991, has been disclaimed.
Int. Cl.[2] A01D *69/10*
U.S. Cl. 56—11.3 **7 Claims**

1. A rotary lawn mower, comprising a housing, power means mounted on the housing and including a drive shaft, wheel means connected to the housing to permit the housing to be moved over the ground, rotatable means disposed within

the housing, said rotatable means including an annular member journalled about the drive shaft, and a cutting blade carried by said annular member, clutch means interconnecting the drive shaft and the annular member and having an engaged position wherein the annular member and the cutter blade are drivingly connected to said drive shaft and having a disengaged position wherein said annular member and said cutter blade are disconnected from said drive shaft, clutch disengaging means for disengaging said clutch means to disconnect the annular member and the cutter blade from the drive shaft, and brake means operable in conjunction with operation of said clutch disengaging means for engaging said rotatable means and stopping rotation of said cutting blade on disengagement of said clutch means.

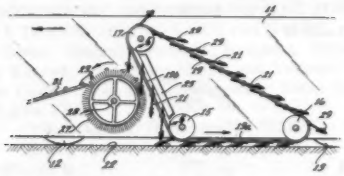


4,041,680

COTTON BOLL GLEANER

James M. Welch, 22151 Wood Island Lane, Huntington Beach, Calif. 92646

Filed May 7, 1976, Ser. No. 684,093
Int. Cl.[2] A01D *46/08*
U.S. Cl. 56—28 **7 Claims**



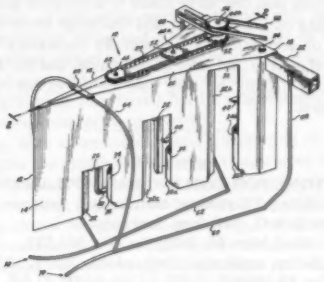
1. A cotton boll gleaner comprising:
a frame;
first means on said frame to move said frame along the ground;
an endless belt;
second means for mounting said belt on said frame to cause said belt to move down close to the ground, to rise, and again move down close to the ground;
a plurality of gleaning elements, pivotably mounted on said belt so that, as said belt passes the respective elements along the ground, the elements drag therealong to glean cotton bolls;
third means for removing the cotton bolls from said elements as said belt moves the elements toward the ground;
each of said elements comprising:
a slender, rigid rod-like body;
a plurality of barbs fixed by one end to said body so that said barbs are axially spaced along and radially spaced around said body;
a ball means fixed at one end of said body;
a finger fixed by one end to said ball means and forming an obtuse angle with said body; and
a socket fixed on said belt for pivotally supporting said ball means so that said body depends from said belt as said belt moves.

4,041,681

CORN DETASSELER

Lucio Chapa, III, 1229 Monroe Ave., Ottumwa, Iowa 52501

Filed May 6, 1976, Ser. No. 683,700
Int. Cl.[2] A01D *45/02*
U.S. Cl. 56—63 **12 Claims**



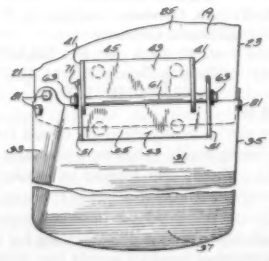
1. Apparatus for removing tassels from corn stalks, comprising:
a body member having a leading and trailing edge, a closed top, vertical sides, an open bottom and an open rear side for movement over a row of corn stalks having tassels thereon,
a plurality of tassel severing means operably mounted to and within said body member in spaced relationship between said leading and trailing edges,
the plane of operation of said respective tassel severing means being progressively higher from said leading edge to said trailing edge,
a respective passageway of a predetermined height range in said body member associated with each respective tassel severing means, and
the height ranges of said passageways being progressively greater from said leading edge to said trailing edge whereby as said body member is moved over a row of corn stalks short stalks within the height range of the first encountered passageway will enter the same for contact with the tassel severing means therein and progressively taller stalks will enter successive passageways according to their relationship to the respective height ranges encountered.

4,041,682

MOUNTING ARRANGEMENT FOR ROTARY MOWER CHUTE EXTENSION

Earl H. Kidd, Galesburg, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Nov. 17, 1975, Ser. No. 632,256
Int. Cl.[2] A01D *75/20*
U.S. Cl. 56—320.2 **6 Claims**



1. A rotary lawn mower including a cutter blade, a cutter

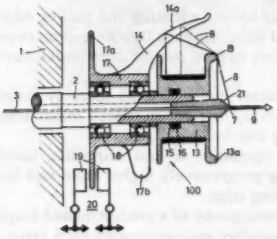
blade housing having a depending wall enclosing said cutter blade and a laterally extending, inverted U-shaped discharge chute having a pair of laterally spaced side walls, an inverted U-shaped discharge chute extension having a pair of laterally spaced side walls, and means connecting said chute extension to said discharge chute for movement of said chute extension from a raised, generally inoperative storage position extending upwardly from said discharge chute to a lowered guard position extending outwardly from said discharge chute with said side walls of said extension in laterally outwardly partially overlying relation to said sides of said chute, and for thereafter non-releasably fixedly holding said chute extension in the guard position.

4,041,683

MACHINE FOR COILING LAMP FILAMENTS

Peter Heimlicher, Thorishaus, Switzerland, assignor to Glühlampenfabrik A.G., Fribourg, Switzerland

Filed Mar. 10, 1975, Ser. No. 556,532
Claims priority, application Switzerland, Jan. 7, 1975, 74/75
Int. Cl.[2] H01B *13/00, 13/08;* **B65H** *81/08*
U.S. Cl. 57—18 **3 Claims**



1. A machine for coiling filaments for incandescent bulbs or gas discharge tubes comprising, a motor-driven spindle, a supply reel mounted on said spindle for holding a supply of filament-wire, a rotor carrying a guide member mounted on said spindle, a motor-driven feed means for continuously advancing a support-wire through said spindle, said filament-wire describing a path between an unwinding location on said reel and a coiling location adjacent to an end of said spindle where said filament-wire is coiled on said support-wire, said guide member including a projecting arm adapted to deviate said filament-wire along said path, said rotor and said guide member being freely rotatable under the influence of said deviated filament on said spindle, said reel being integral in rotation with said spindle.

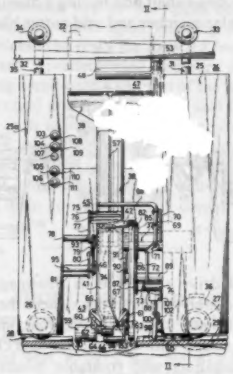
4,041,684

DEVICE FOR AUTOMATICALLY JOINING A THREAD FOR SPINNING

Heinz Kamp, Rickelrath, Germany, assignor to W. Schlafhorst & Co., Monchengladbach, Germany

Filed Sept. 20, 1976, Ser. No. 724,925
Claims priority, application Germany, Sept. 18, 1975, 2541589
Int. Cl.[2] D01H *15/00*
U.S. Cl. 57—34 R **10 Claims**

1. Device for automatically joining a thread for spinning in an open-end spinning maching having a pivotable bent suction tube for seizing a thread end located on a take-up coil, the suction tube being formed at the inside of the bend thereof with a longitudinally extending slit for passage therethrough of a sucked-in thread, comprising a pivot bearing for the pivotable suction tube, a negative pressure supply line connected to the suction tube at said pivot bearing, a transfer arm connected at one end thereof to the suction tube at said pivot bearing, and thread gripping means mounted for movement from said pivot bearing to the free end of said transfer arm for transfering a



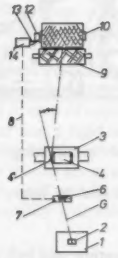
thread end from said pivot bearing to said free end of said transfer arm.

4,041,685

PROCESS AND APPARATUS FOR REATTACHMENT OF A THREAD IN AN OPEN-END SPINNING MACHINE

Gerhard Grau, Albershausen, and Otto Mayer, Ebersbach, both of Germany, assignors to Zinser Textilmaschinen GmbH, Ebersbach, Germany

Filed Nov. 18, 1974, Ser. No. 524,874
Claims priority, application Germany, Nov. 16, 1973, 2357223
Int. Cl.[2] D01H *15/00, 1/12*
U.S. Cl. 57—34 R **7 Claims**



1. In a process for attachment of threads within an open-end spinning machine with at least one spinning rotor, a windup spindle and a pair of draw rollers, disposed between said spinning rotor and said windup spindle, including the steps of introducing the thread into said spinning rotor; attaching the thread to said fibers located in said spinning rotor; and winding up the thread on said windup spindle, with the thread length between the spinning rotor and the windup spindle defining a thread path; the improvement comprising the steps of:

a. orienting the pair of draw rollers in the spinning machine relative to the windup spindle and the spinning rotor such that an end face of one of the draw rollers lies in a plane displaced relative to the thread path;

b. placing the thread in contact with said end face for maintaining it in a position wherein it does not lie on the line of contact between said pair of draw rollers and is misaligned relative to said thread path;

c. sensing the increase in tension in the thread which occurs

when the thread inserted into said spinning rotor shares the rotary motion thereof; and

d. initiating the rotary motion of the windup spindle in the winding up direction in response to said increase in tension; whereby the tension in the thread urges it to move onto the line of contact between said pair of draw rollers and into alignment with said thread path.

2. An apparatus for the attachment of threads within an open-end spinning machine comprising:

at least one spinning rotor;

a windup spindle associated with each spinning rotor;

a distribution means disposed between each spinning rotor and its associated windup spindle, the distribution means defining a thread guide traversing path along the axis of the windup spindle;

a thread guide disposed between each spinning rotor and its associated distribution means;

a pair of draw rollers disposed between each associated thread guide and distribution means, with an end face of at least one draw roller passing through a plane defined by the thread guide and the thread guide path of the distribution means so that a thread, which is run from the windup spindle along the thread guide traversing path of the distribution means through the thread guide and inserted into the spinning rotor for the purpose of attachment to fibers therein but which is not yet attached, lies against said at least one draw roller end face and defines a reverse path which deviates from the path that the thread would define during normal operation; and

a thread tension sensing means, disposed between each spinning rotor and its associated windup spindle, for starting the thread windup spindle upon sensing an increase in the thread tension caused when the end of the thread inserted into the spinning rotor shares the rotary motion thereof;

whereafter further increase in tension between the spinning rotor and its associated windup causes the thread to be guided into a pinch line between the two draw rollers.

4,041,686

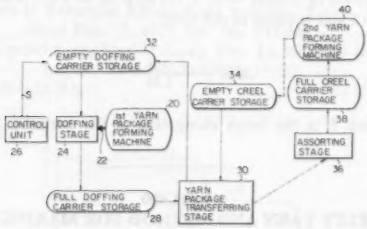
METHOD OF AND ARRANGEMENT FOR TRANSPORTING YARN PACKAGES

Mitugu Inaba, Ibaragi; Noriyuki Kouguchi, Nishinomiya; Masao Kagawa, Suita; Kozo Hosho, and Yoshiaki Teraoka, both of Osaka, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Dec. 20, 1976, Ser. No. 752,623

Int. Cl.[2] D01H *9/00, 9/18;* **B65H** *54/22*

U.S. Cl. 57—34 R **15 Claims**



1. A method of transporting yarn packages from a first processing region in which there is arranged at least a first yarn package forming machine having a plurality of winding mechanisms, each having at least one winding spindle, into a second processing region in which there is arranged at least a second yarn package forming machine having a plurality of winding mechanisms, comprising:

doffing said yarn packages from said first yarn package forming machine and loading the doffed yarn packages onto a plurality of yarn package holding pegs of a first transporting carrier conveyed to a side of said first yarn package forming machine so that the mutual positional relationship between said yarn packages on said plurality of yarn package holding pegs is unchanged from that between said yarn packages while they were being formed by said first yarn package forming machine;

conveying said first transporting carrier loaded with said doffed yarn packages to a yarn package transferring stage;

transferring, at said yarn package transferring stage, said yarn packages from said plurality of pegs of said first transporting carrier to a plurality of yarn package holding pegs of a second transporting carrier, each of said yarn packages being transferred onto a predetermined peg of said second transporting carrier;

returning, after completion of said transferring of said yarn packages, the emptied first transporting carrier to a place adjacent to said first yarn package forming machine in said first processing region, thereby permitting said first transferring carrier to again receive freshly formed yarn packages from said first yarn package forming machine;

conveying said second transporting carrier loaded with said yarn packages transferred from said first transporting carrier to a position above said second yarn package forming machine in said second processing region, thereby permitting said second transporting carrier to function as a creel car for supplying filament yarns, which are unwound from said yarn packages, to said second yarn package forming machine, and;

returning said second transporting machine toward said yarn package transferring stage after completion of said supplying of said filament yarns.

5. An arrangement for transporting yarn packages comprising:

at least a first yarn package forming machine having a plurality of winding mechanisms, each having at least one winding spindle;

at least a second yarn package forming machine having a plurality of winding mechanisms, said second yarn package forming machine being spaced apart from said first yarn package forming machine;

means for doffing said yarn packages from said plurality of winding mechanisms of said first yarn package forming machine;

first means for transporting said yarn packages doffed by said doffing means into a yarn package transferring stage located between said first and second yarn package forming machines, said first transporting means having means for holding said doffed yarn packages;

second means for transporting said yarn packages from said yarn package transferring stage to said second yarn package forming machine when said yarn packages are transferred from said first transporting means onto said second transporting means, said second transporting means having means for holding said transferred yarn packages and being capable of functioning as creel means for supplying filament yarns to said second yarn package forming machine;

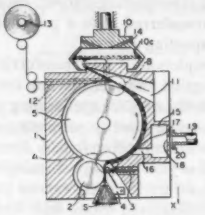
first means for conveying said first transporting means from a side of said first yarn package forming machine to said yarn package transferring stage and for returning said first transporting means from said yarn package transferring stage toward said first yarn package forming machine, and;

second means for conveying said second transporting means from said yarn package transferring stage to said second yarn package forming machine and for returning said second transporting means from said second yarn package forming machine toward said yarn package transferring stage.

4,041,687
DEVICE FOR REMOVING IMPURITIES SEPARATED FROM FIBERS IN OPEN END SPINNING UNIT

Kozo Motobayashi, Aichi; Takeshi Shimizu, and Noriaki Miyamoto, both of Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho and Daiwa Boseki Kabushiki Kaisha, both of Japan

Filed Mar. 29, 1976, Ser. No. 671,694
Claims priority, application Japan, Apr. 2, 1975, 50-40679
Int. Cl.[2] D01H *1/12, 11/00*
U.S. Cl. 57—56 7 Claims



1. A device for removing impurities separated from individual fibers opened up in a spinning unit of an open-end spinning machine, which has the spinning unit mounted on a frame thereof for movement between an operative position and an inoperative position, the spinning unit including a sliver supply section, and a sliver opening section combing out a sliver from the sliver supply section into the individual fibers, the impurity separating device comprising:

an impurity collecting chamber provided in the spinning unit in communication with the sliver opening section so that the impurities separated from the individual fibers enter the chamber;

a first passageway provided in the spinning unit for allowing the impurities in the chamber to come out thereof, the first passageway having an inner end opening into the chamber and an outer end opening into the atmosphere surrounding the spinning unit at all positions of said spinning unit;

a source of vacuum;

a second passageway fixedly mounted on the frame of the spinning machine and having one end connected to said source of vacuum and having the other end spaced from the outer end of the first passageway in all positions of the spinning unit; and

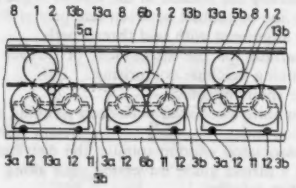
means for providing a predetermined gap between the outer end of the first passageway and the other end of the second passageway when the spinning unit is in the operative position, said means comprising a pair of surfaces defining a gap between said outer end and said other end and spaced from each other at a distance and having a total surface area for causing air flowing through the gap into the second passageway to encounter sufficient resistance to limit the amount of air flowing therethrough to an amount below a predetermined level, whereby the impurities in the chamber are removed therefrom through the disconnected first and second passageways.

4,041,688
BEARING MEANS FOR SPINNING ROTORS OF AN OPEN-END SPINNING MACHINE

Hans Stahlecker, Suessen, Germany, assignor to Fritz Stahlecker and Hans Stahlecker, Germany

Filed July 29, 1975, Ser. No. 600,054
Claims priority, application Germany, Aug. 10, 1974, 2438527
Int. Cl.[2] D01H *1/241*
U.S. Cl. 57—104 14 Claims

1. A bearing arrangement for a spinning unit of an open-end spinning machine, the spinning unit including a spinning rotor having a rotor shaft driven by a tangential belt, the shaft is mounted in a wedge formed by supporting rings having bearing elements, the bearing arrangement comprising: one common pillow block means for mounting bearing elements of the supporting rings of the spinning unit, and elastic supporting

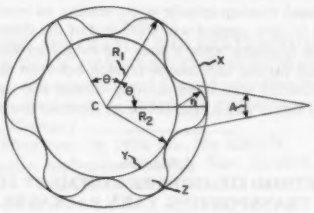


means having a preferred direction of movement for supporting said pillow block means at the spinning unit and for preventing seesaw movements of the rotor shaft about an axis located at right angles to the shaft.

4,041,689
MULTILOBAL POLYESTER YARN

Patrick Joseph Duncan, Hendersonville, Tenn., and Francis Edward Scrivener, Jr., Chester, Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 11, 1975, Ser. No. 631,127
Int. Cl.[2] D02G *3/02, 1/02*
U.S. Cl. 57—140 J 8 Claims



1. An improved partially oriented multifilament polyester yarn for draw-false-twist texturing composed of polyester filaments of multilobal cross-section characterized by a total number (N) of 6 to 10 essentially symmetric lobes of substantially equal length, equispaced radially about the center of the filament cross-section, a modification ratio (M) between 1.17 and 1.85 and a denier per filament of a minimum of $3.8R_o$ and a maximum of $(5.88M - 10 + N)\,R_o$ at $M = 1.85$, wherein R_o is 1.25–5 and is equal to the ratio

$$M = \frac{1 + 0.01\,(E)}{1.35}$$

in which E is the break elongation of the partially oriented yarn.

4,041,690
NOVELTY YARN AND METHOD FOR MAKING SAME

John Wesley Lambert, Jr., Spartanburg, S.C., assignor to Tuscarora Cotton Mill, Mount Pleasant, N.C.

Filed Nov. 5, 1975, Ser. No. 629,019
Int. Cl.[2] D02G *3/34, 3/36*
U.S. Cl. 57—144 19 Claims

1. A novelty yarn comprising a ground strand of spun staple fibers, relatively short varying length and varying size auxiliary strands of staple fibers randomly arranged in spaced relation along the ground strand and being spirally twisted thereabout, the largest size auxiliary strands having portions thereof formed of such a large number of fibers and being so arranged spirally around the ground strand that adjacent turns

of said portions overlie and substantially shield the underlying ground strand from view, other intermediate size auxiliary strands formed of a lesser number of fibers and being so arranged spirally around the ground strand that both the ground strand and the auxiliary strand are individually discernible, and other smallest size auxiliary strands being formed of such a few number of fibers arranged spirally around the ground strand as to be barely discernible thereon.

13. A method of making a novelty yarn having relatively short varying length and varying size auxiliary strands randomly distributed therealong, said method comprising advanc-

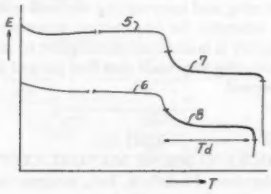
ing at least one strand of staple fibers into and through a drafting zone and drafting the fibers while continuously forming a single ground strand of drafted staple fibers therefrom and while feeding an auxiliary strand of staple fibers from outside the drafting zone directly into the delivery end of the drafting zone in such a manner as to effect a random parting of the auxiliary strand and thereby form relatively short varying length auxiliary strands randomly distributed along the ground strand, and twisting the ground strand and the randomly distributed auxiliary strands to arrange the auxiliary strands spirally around the ground strand and form a novelty yarn therefrom.

4,041,691

ELECTRONIC TIMEPIECE BATTERY MONITORING CIRCUIT

Hiroyuki Chihara, and Yasushi Okada, both of Suwa, Japan, assignors to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Dec. 15, 1975, Ser. No. 641,046
Claims priority, application Japan, Dec. 13, 1974, 49-143170
Int. Cl.[2] G04C *3/00*; G08B *21/00*
U.S. Cl. 58—23 BA **12 Claims**



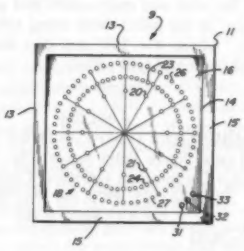
1. In an electronic timepiece including display means for displaying time in response to timekeeping signals applied thereto and for indicating a voltage level representative of impending failure of a power source in response to an indication signal applied thereto, the improvement comprising an electrochemical power source for delivering at least two characteristic voltage levels, said first voltage level corresponding to a first plateau of discharge, and a second voltage level corresponding to a last plateau of discharge being sustained essentially at said second voltage level for a predetermined interval of time prior to the ultimate failure of said electrochemical power source, battery voltage detecting means coupled to said electro-chemical power source for detecting a change from said first voltage level to said second voltage level and producing an indication signal in response to said second voltage level, and timekeeping means coupled to said power source for being energized by said power source when same is delivering said respective characteristic voltage levels and, in response to being energized by said power source, applying timekeeping signals to said display means.

4,041,692

ELECTRONIC CLOCK HAVING TIME INDICATING LIGHT DISPLAY

James B. Marshino, Goodland, Ind., assignor to Amelect Incorporated, Goodland, Ind.

Filed Jan. 8, 1976, Ser. No. 647,382
Int. Cl.[2] G04B *19/34*; G04C *3/00*
U.S. Cl. 58—50 R **16 Claims**



1. An electronic clock having a time indicating light display, said electronic clock comprising:

pulse generating means for producing output pulses at predetermined times;

decoding means connected with said pulse generating means to recieve said output pulses therefrom, said decoding means including a plurality of frequency dividers providing separate outputs indicative of time in hours, minutes and seconds; and matrix means including a plurality of matrixes two of which are 6×10 matrixes and the other of which is a 1×12 matrix, each of which matrixes is connected with a different one of said plurality of frequency dividers of said decoding means to receive therefrom said indications of time in hours, minutes and seconds, said matrix means including light means positioned in three separate segments each of which segments surrounds a point common to all of said segments, said light means being connected with said timing means for selective energization of a portion of each segment of said light means to thereby produce three separate light displays the energized portion of one such segment indicating time in hours, the energized portion of a second of which segments indicates time in minutes, and the energized portion of the third of which segments indicates time in seconds.

4,041,693

ESCAPEMENT FOR A TIMEPIECE

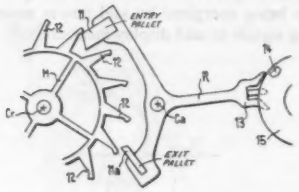
Francois Bonsack, Le Locle, Switzerland, assignor to Les Fabriques d'Assortiments Reunies, Le Locle, Switzerland

Continuation of Ser. No. 390,343, Aug. 22, 1973, abandoned. This application Sept. 19, 1975, Ser. No. 615,111

Claims priority, application Switzerland, Sept. 1, 1972, 12907/72

Int. Cl.[2] G04B *15/00*

U.S. Cl. 58—116 R **2 Claims**



1. An escapement for a timepiece comprising an escape wheel having a plurality of teeth, and a pallet arm having entry and exit pallets disposed for cooperation with said teeth, said pallet arm being rotatable about an axis, and wherein a first line connecting the center of the entry-pallet to the center of the escape wheel defines an angle relative to a second line connecting the center of the escape wheel to the pallet axis, which angle embraces at least one tooth more of said wheel than the corresponding angle of the center of the exit-pallet relative to said second line, the angle β between the direction of movement of said teeth and the direction of movement of said pallets being acute for both said entry-pallet and said exit-pallet, and the inclination of the pallet faces being substantially equal to $\frac{1}{2}(\pi-\beta-\phi)$, where $\pi = 180°$ and $\phi =$ the angle of friction between said teeth and said pallets.

4,041,694

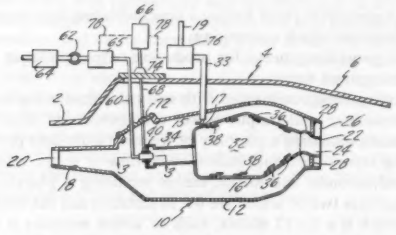
COMBUSTION TEMPERATURE CONTROL

George D. Lewis, North Palm Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Aug. 25, 1975, Ser. No. 607,651

Int. Cl.[2] F02C *9/08*

U.S. Cl. 60—39.02 **10 Claims**



1. A flame temperature control system for a gas turbine engine having a combustion chamber, air inlet means, combustion chamber gas discharge means, and fuel injection means, including combustion chamber inlet air sampling means, combustion chamber hot gas sampling means, said inlet air sampling means including a first fixed area orifice for continuously directing a sample flow of inlet air therethrough, said hot gas sampling means including a second fixed area orifice for continuously directing a sample flow of hot gas therethrough, means for receiving said sample flows from said sampling means and directly mixing the samples, means for detecting the temperature of the mixed gases, and means for adjusting the fuel-air ratio in said combustion chamber in response to the detected temperature to maintain a desired temperature in said combustion chamber.

10. A method of maintaining a desired temperature in a combustion chamber comprising the steps of:

1. selecting a desired temperature for a combustion chamber;
2. taking a continuous sample of combustion chamber cold gas through a fixed area orifice;
3. taking a continuous sample of combustion chamber hot gas through a fixed area orifice,
4. directly mixing the two gas samples,
5. taking the resultant temperature of the mixed gas samples,
6. controlling the fuel-air ratio in said combustion chamber in response to the temperature of the mixed gas samples to maintain said selected temperature in said combustion chamber.

4,041,695

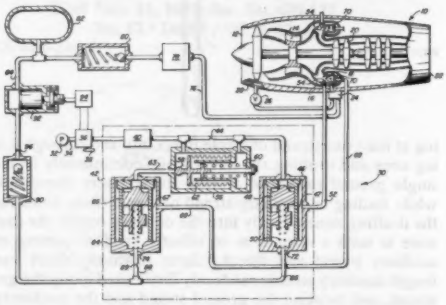
FUEL SYSTEM PNEUMATIC PURGE APPARATUS AND METHOD

John Everett Harper, and Louis H. Kell, both of Phoenix, Ariz., assignors to The Garrett Corporation, Los Angeles, Calif.

Filed Nov. 21, 1975, Ser. No. 634,219

Int. Cl.[2] F02C *7/22, 9/12, 7/26*

U.S. Cl. 60—39.02 **19 Claims**



1. A method of purging fuel from the fuel delivery system in a gas turbine engine upon shutdown of the engine, comprising the steps of:

bleeding air from the discharge of the compressor of the engine during substantially full speed operation;

storing said bleed air in a pneumatic accumulator;

reducing engine speed to reduce pressure in the combustion chamber of the engine to a value substantially less than that of bleed air stored in the accumulator;

interrupting flow of fuel being delivered through a fuel manifold to the combustion chamber;

communicating said accumulator with said fuel manifold after said engine speed reducing step to purge fuel from the manifold into the combustion chamber; and

relatively timing said interrupting step and said communicating step whereby the combustion process in the combustion chamber is maintained subsequent to initiation of said communicating step such that fuel purged from the manifold is burned.

4,041,696

VEHICLE TURBINE MANUAL CONTROL

Donald E. Morrison, Plainfield, Ind., assignor to General Motors Corporation, Detroit, Mich.

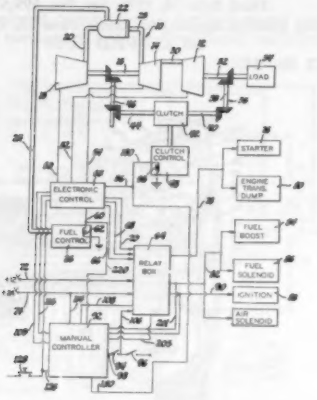
Filed May 24, 1976, Ser. No. 689,131

Int. Cl.[2] F02C *7/26, 3/10*

U.S. Cl. 60—39.14 **5 Claims**

1. A gas turbine control system for controlling operation of a gas turbine engine starter and a gas turbine engine having a compressor driven by a turbine to supply air to a combustor having a fuel supply thereto for combustion with air to pro-

duce motive fluid for the turbine, said control system comprising: fuel control means energizable to modulate fuel flow to the combustor, automatic electronic control means responsive to predetermined engine parameters to produce a control signal connected to said fuel control means for control of engine operation, means for energizing said automatic electronic control means including a main switch and a start switch, a manual controller for energizing said fuel control means, means including said main switch and manual selector switch means to selectively and independently power said electronic control means and said manual controller, manual controller relay means responsive to operation of said main switch and



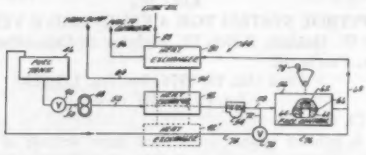
said manual selector switch means when said electronic control means is disabled, said manual controller further including timer means energized in response to energization of said relay, a DC battery voltage source, start circuit means responsive to energization of said relay and timer means for connecting said DC voltage source to the starter of said engine during a start phase of operation, means connected in circuit relationship with said start circuit for directing an initially reduced battery voltage as produced by current flow through said start circuit means to said fuel control means during the start phase of operation to produce a ramped fuel signal to increase fuel flow as a function of engine speed increased during a manual start phase of operation.

4,041,697

OIL COOLING SYSTEM FOR A GAS TURBINE ENGINE

George A. Coffinberry, Cincinnati, and Howard B. Kast, Fairfield, both of Ohio, assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed July 17, 1975, Ser. No. 596,641
Int. Cl.[2] F02C 9/08
U.S. Cl. 60—39.28 R **21 Claims**



1. A fuel delivery and control system for use with a gas turbine engine and a fuel reservoir, said system comprising:

pump means communicating with the fuel reservoir for drawing fuel therefrom and pressurizing same;

a fuel control in downstream flow communication with the pump means for receiving fuel therefrom, said fuel control including metering means for scheduling the rate of fuel flow to the engine;

a first heat exchanger for receiving all of the metered fuel and further communicating with the gas turbine engine for receipt of hot engine oil therefrom, wherein the hot engine oil is maintained in heat exchange relation with the fuel and then returned to the engine at a cooler temperature; and

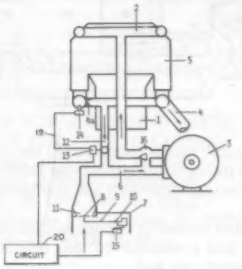
means for reducing the fuel temperature to the inlet of the first heat exchanger by returning all fuel in excess of engine requirements back to the fuel reservoir.

4,041,698

EXTERNAL COMBUSTION ENGINE WITH EXHAUST GAS RECIRCULATION OF CONSTANT MASS FLOW RATE

Mats Inge Moritz, Trelleborg, Sweden, assignor to Kommanditbolaget United Stirling (Sweden) AB & Co., Malmo, Sweden

Filed June 3, 1975, Ser. No. 583,472
Int. Cl.[2] F02G 1/04
U.S. Cl. 60—39.52 **2 Claims**



2. An external combustion engine comprising a combustin air blower, a combustion air intake duct for said blower, a baffle in said intake duct movably mounted such that the combustion air flow in a further part of said intake duct has a substantially constant static pressure independent of variations in the mass flow magnitude of the combustion air flow therein, means for regulating the supply of fuel in proportion to the supply of combustion air, an exhaust gas duct, a recirculation duct connecting the exhaust gas duct to the said further part of the intake duct, means for establishing and maintaining a substantially constant static pressure in said exhaust gas duct, and means for maintaining a substantially constant predetermined resistance against the flow of exhaust gases through the recirculation duct.

4,041,699

HIGH TEMPERATURE GAS TURBINE

Helmut R. Schelp, Pacific Palisades, Calif., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Dec. 29, 1975, Ser. No. 645,004
Int. Cl.[2] F02C 7/00, 7/12
U.S. Cl. 60—39.55 **10 Claims**

1. A gas turbine engine comprising:

a shaft mounted for rotation about an axis;

compressor means attached to said shaft for rotation therewith;

turbine means attached to said shaft for rotation therewith, said turbine means having internal cooling passages therein and cooling liquid inlet and outlet openings;

first conduit means connected to the inlet opening in said turbine for conducting cooling liquid to said turbine;

combustor means for receiving cycle fluid from said compressor and fuel from a source of combustible fuel, said combustor comprising:

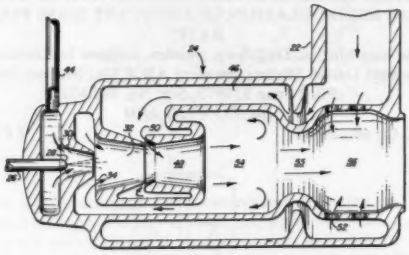
a first mixing chamber connected to said source of combusti-

ble fuel and said second conduit means for mixing said fuel and cooling liquid;

a second mixing chamber connected to receive the contents of said first mixing chamber and cycle fluid from said compressor means for vaporizing and mixing said fuel and cooling liquid mixture;

a first combustion chamber for receiving the contents of said second mixing chamber for gasification and primary combustion therein;

a second combustion chamber separated from said first combustion chamber and connected to receive the contents of said first combustion chamber and additional cycle fluid from said compressor for secondary combustion therein;



second conduit means connected to the outlet of said turbine cooling passages for conducting cooling liquid from said turbine to said combustor and combining it with said cycle fluid;

third conduit means for conducting the products of combustion of said combustor to said turbine for extraction of work therefrom; and

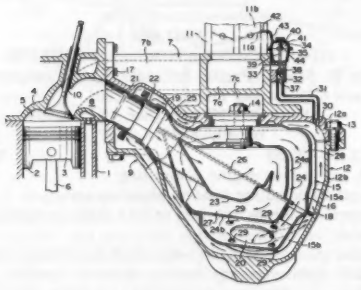
at least one heat exchanged connected in said second conduit means between the outlet opening of said turbine passages and the inlet to said combustor, said heat exchanger receiving heat from the exhaust gas from said turbine and transferring said heat to the cooling liquid from said turbine.

4,041,700

MANIFOLD REACTOR

Takamitsu Okamoto, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed May 4, 1976, Ser. No. 683,221
Claims priority, application Japan, Feb. 17, 1976, 51-17702
Int. Cl.[2] F02M *25/06*; F01N *3/10*
U.S. Cl. 60—278 **4 Claims**



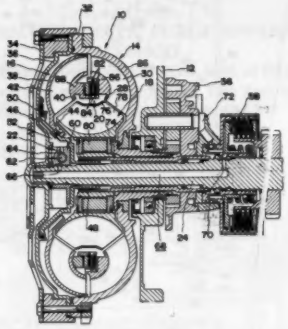
1. A manifold reactor comprising an inner core which defines a reactor chamber therein, said inner core having inlet and outlet ports for conducting exhaust gases into and out of said reactor chamber, and an outer core which encloses said inner core while defining a heat insulating space between said inner core and outer core, said heat insulating space being connected with said reactor chamber through an opening formed in said inner core and communicating to an EGR gas intake port formed in said outer core.

4,041,701

HYDRAULIC TORQUE CONVERTER WITH A LOCKUP CLUTCH BETWEEN PUMP AND TURBINE

Isamu Goto, Kiyose; Sadanori Nishimura, Ohmiya, and Eiichiro Kawahara, Tokorozawa, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed June 24, 1976, Ser. No. 699,633
Claims priority, application Japan, June 28, 1975, 50-80326
Int. Cl.[2] F16D *33/00*
U.S. Cl. 60—347 **12 Claims**



1. In a hydraulic torque converter having pump means, turbine means and reactor means, and an output shaft, the improvement comprising a lockup clutch for directly coupling said pump means and said turbine means, said lockup clutch being accommodated in an annular space bounded by said pump means and said turbine means and said reactor means, a carriage coupled to the output shaft for rotation therewith and for relative axial travel, a flywheel coupled to said pump means for rotation therewith, said flywheel and carriage defining a clutch actuating chamber surrounding said output shaft, said clutch actuating chamber being effective to engage said lockup clutch when supplied with fluid pressure, a source of fluid under pressure, a control valve for selectively communicating said clutch actuating chamber with said source and with a fluid drain, said carriage being displaceable between a retracted and an advanced position corresponding to the connection with the drain or the fluid pressure source, and seal means between said carriage and said flywheel for sealing said clutch actuating chamber to isolate the same from said lockup clutch when the carriage is in retracted position.

4,041,702

CONTROL SYSTEM FOR A FLUID DRIVE VEHICLE

Cyril W. Habiger, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 15, 1976, Ser. No. 732,673
Int. Cl.[2] F16H *39/46*
U.S. Cl. 60—431 **17 Claims**

1. A control system for a fluid drive vehicle of the type having an engine speed control movable from an idling position to increase engine speed, a fluid drive transmission having a control element movable from a neutral position progressively to increase the drive ratio and fluid actuator means coupled to the control element for moving it from the neutral position in response to pressurized fluid received by the fluid actuator means, the control system comprising:

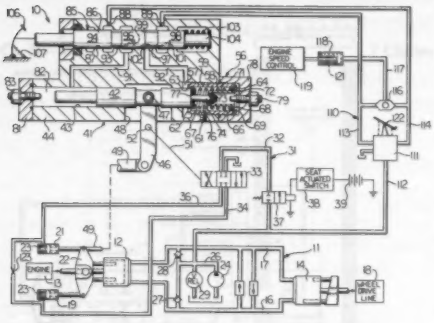
auxiliary pump means;

a first fluid circuit connecting the auxiliary pump means to the fluid actuator means including a control valve movable in a first direction from a neutral fluid blocking position progressively to increase the flow of pressurized fluid to the fluid actuator means;

a servo mechanism operatively connected to the control valve for moving it from the neutral position in response to pressurized fluid received by the servo mechanism;

a fluid motor resiliently biased to move the engine speed control to the idling position and operative to move the engine speed control to increase the engine speed in response to pressurized fluid received by the fluid motor; and

a second fluid circuit connecting the auxiliary pump means to the servo mechanism and the fluid motor including a



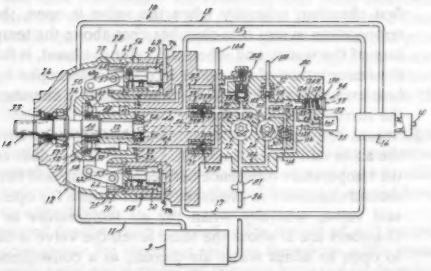
pressure control valve manually actuatable from a neutral fluid flow blocking position to an actuated position for providing fluid flow therethrough to the servo mechanism and the fluid motor and for regulating and maintaining the pressure of the fluid delivered to the servo mechanism and the fluid motor at a pressure level commensurate with said actuated position, and an inching valve selectively manually actuatable from an open position which permits substantially unrestricted fluid flow to the servo mechanism to an actuated position restricting fluid flow to the servo mechanism for reducing the pressure of the fluid delivered to the servo mechanism from the pressure control valve while maintaining the pressure of the fluid directed to the fluid motor at the pressure level determined by the pressure control valve.

4,041,703

HYDROSTATIC TRANSMISSION WITH INTEGRAL AUXILIARY PUMP

Kenneth K. Knapp, Battle Creek, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed May 24, 1976, Ser. No. 689,283
Int. Cl.[2] F16H *39/46*; F15B *15/18*
U.S. Cl. 60—464 **15 Claims**



1. In a hydrostatic transmission system of the type including a reservoir; a fluid actuated motor; and a pump assembly comprising a housing assembly, a shaft assembly carried for rotation in the housing assembly, a main pump assembly rotatively driven within the housing assembly by the shaft and fluidly connected to the motor, and a charge pump assembly rotatively driven within the housing assembly by the shaft assembly and fluidly connected at its inlet to the reservoir and at its outlet to the main pump assembly, the improvement wherein:

A. said pump assembly further comprises an auxiliary pump assembly rotatively driven within said housing assembly by said shaft assembly and having an inlet fluidly connected to said reservoir and an outlet and said system further comprises:

B. auxiliary hydraulic power takeoff means; and

C. means for directing the flow of fluid from said outlet of said auxiliary pump assembly, said fluid directing means comprises valve means selectively operable

1. in one condition to direct fluid to said hydraulic power takeoff means, and

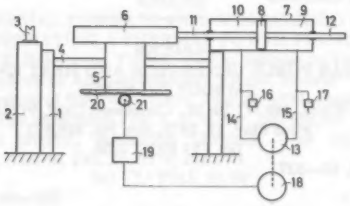
2. in another condition to direct fluid to said charge pump inlet.

4,041,704

STOP MECHANISM FOR A BENDING PRESS, PLATE SHEAR OR THE LIKE MACHINES

Walter Gygli, Niederbipp, Switzerland, assignor to Haemmerle, A. G. Maschinenfabrik, Zofinger, Switzerland

Filed May 20, 1976, Ser. No. 688,279
Claims priority, application Austria, June 18, 1975, 4728/75
Int. Cl.[2] F15B *15/18*
U.S. Cl. 60—473 **3 Claims**



1. A stop mechanism for a bending press, plate shearing press or like machine in combination with a work-table and with a work-piece stop which is horizontally adjustable along the work-table thereby defining the position of the work-piece relative to the bending or shearing machine comprising:

an adjustable position-preselector serving as a position control-unit coupled with said work-piece stop to determine the momentary difference between the actual position and the value set by the preselector;

an indicator of the momentary position of the workpiece stop which is mounted on said position control-unit;

programming means for programming said position control-unit in a desired position;

a hydraulic piston-cylinder unit having hydraulic drive means;

said piston-cylinder unit having one cylinder with a chamber on each side of said piston which can be displaced in two opposite directions, the displacement of said piston in one of said directions displacing said stop in that direction and the displacement of said piston in the other direction displacing said stop in the other direction;

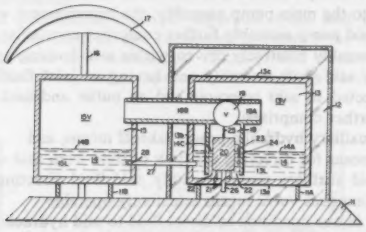
said hydraulic drive means comprising a pump and separate pipes from said pump to each of the chambers on each side of the piston so that the driving of said pump is controlled by said position control unit coupled with said work-piece stop under a slight over pressure of the hydraulic fluid.

4,041,705

LOW TEMPERATURE ENGINE

Israel Siegel, 351 W. 71 St., New York, N.Y. 10023

Filed Apr. 7, 1976, Ser. No. 674,552
Int. Cl.² F03G 7/04
U.S. Cl. 60—497 **11 Claims**



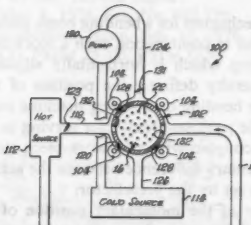
1. A low temperature engine comprising a warm chamber, adapted to keep a fluid at a relatively warm temperature,
a cold chamber adapted to keep a fluid at a relatively cold temperature,
said chambers being sealed from the outside air,
a supply of evaporating liquid in said chambers having a liquid level partitioning the chambers into vapor chamber portions and liquid chamber portions,
a tube which dips at its low open end in liquid portion inside warm chamber to define a liquid surface area inside and outside said tube,
means for intermittant communication of liquid surface area inside the tube with vapor phases of the cold and warm chambers, to effect changes of the fluid level,
and means for obtaining a temperature differential between the chambers.

4,041,706

LINEAR FORCE GENERATOR AND HEAT ENGINE EMBODYING SAME

Fred I. White, 489 W. 7th St., Claremont, Calif. 91711

Filed Mar. 17, 1975, Ser. No. 558,822
Int. Cl.² F03G 7/06
U.S. Cl. 60—527 **5 Claims**



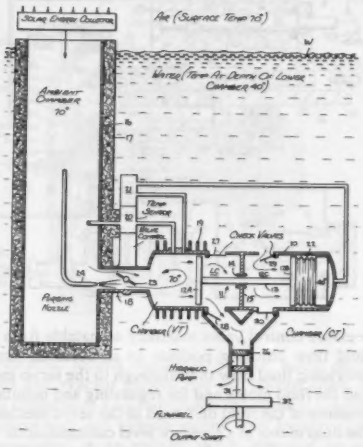
1. A heat powered linear force generator comprising:
a relatively fixed support,
a relatively movable output member,
means supporting said output member for reciprocating motion along a linear path toward and away from said support,
force producing means including at least one elongate linearly expandable and contractible force producing element having a relatively high coefficient of thermal expansion and contraction extending between and secured at its ends to said support and output member, respectively, and
means for exposing said force generating element alternately to relatively hot and relatively cold working fluids to effect alternate thermal expansion and contraction of said element, said exposing means comprising an elongate housing in closing said force producing means, hot and cold fluid supply conduits, ports in said housing, and means for moving said housing to communicate said housing ports with said hot and cold conduits alternately.

4,041,707

UNDERWATER THERMAL ENERGY CONVERSION UNIT

Donald Spector, 380 Mountain Road, Union City, N.J. 07087

Filed July 7, 1976, Ser. No. 703,284
Int. Cl.² F03G 7/04
U.S. Cl. 60—641 **15 Claims**



1. An underwater thermal energy conversion unit comprising:
A. a cylinder submergible in a body of water at a depth at which a marked temperature difference is encountered between ambient air temperature at the surface and water temperature;
B. a reciprocating piston assembly disposed in said cylinder and dividing the cylinder into an air-filled variable temperature first chamber and an air-filled constant temperature second chamber, both chambers being in heat exchange relationship with the cold water at the depth of submersion;
C. a duct communicating with said first chamber and extending to the surface whereby said first chamber is fillable with air at ambient temperature, the temperature of air in the second chamber always being that of the surrounding water;
D. a control valve interposed between said duct and said first chamber, whereby when the valve is open, the air temperature in said first chamber rises above the temperature of the water, and when the valve is closed, it falls to the temperature of the water at a rate determined by the heat exchange relationship between said first chamber and the surrounding water; and
E. means responsive to the temperature difference between the air in said first chamber and the air in said duct and to the temperature difference between the air in said first and second chambers to produce control signals for operating said valve, whereby when the air temperature in both chambers are at about the same level, the valve is caused to open to admit warm air therein, as a consequence of which the temperature in the first chamber rises to create a pressure difference causing the piston assembly to move

in the direction of the second chamber and to compress the air therein until a point of pressure equilibrium is reached, and when the temperature in the first chamber reaches a temperature level close to that of the ambient air, the valve closes and the air temperature in the first chamber then proceeds to fall, in the course of which the compressed air in the second chamber forces the cylinder assembly in the direction of the first chamber until a point of pressure equilibrium is reached.

4,041,708

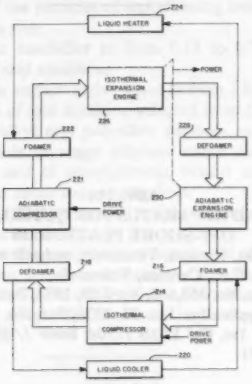
METHOD AND APPARATUS FOR PROCESSING VAPOROUS OR GASEOUS FLUIDS

Otto E. Wolff, Weston, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Division of Ser. No. 402,315, Oct. 1, 1973. This application Dec. 6, 1976, Ser. No. 747,716

Int. Cl.[2] F01K *25/04, 25/06*

U.S. Cl. 60—649 **7 Claims**



1. A gas expansion engine apparatus comprising:

a first foaming unit for foaming a gas with a foamable liquid to provide a foam thereof, said foaming unit having an inlet arrangement and an outlet, said inlet arrangement including a first inlet conduit for introducing said gas to said first foaming unit and a second inlet conduit for introducing said foamable liquid to said first foaming unit, said outlet being adapted for withdrawal of said foam from said first foaming unit;

a first compressor having its inlet coupled to said outlet of said first foaming unit for receiving said foam therefrom and for compressing said foam from a first to a second pressure level to isothermally compress the gas contained in said foam from said first to said second pressure level;

a first defoaming unit having an inlet coupled to the outlet of said first compressor for receiving said foam therefrom and for separating said gas from said liquid of said foam while maintaining said separated gas at said second pressure level, said first defoaming unit having a gas outlet configured for independent withdrawal of said separated gas and a liquid outlet configured for independent withdrawal of said separated liquid;

a second compressor having its inlet coupled to said gas outlet of said first defoaming unit for receiving said separated gas therefrom and for compressing said gas to adiabatically raise the pressure thereof from said second level to a third level;

a second foaming unit coupled to the output of said second compressor for receiving said gas therefrom while maintaining said gas at said third pressure level and for foaming said received gas with a foamable liquid to provide a foam thereof, said second foaming unit having an inlet arrangement and an outlet, said inlet arrangement of said second foaming unit including a first inlet conduit for introducing said gas to said second foaming unit and a second inlet conduit for introducing said foamable liquid to said second foaming unit, said outlet being adapted for withdrawal of said foam from said second foaming unit;

a first expansion engine having a foam inlet and a foam outlet, said foam inlet of said first expansion engine being coupled to said output of said second foaming unit to receive said foam therefrom, said first expansion engine allowing said received foam to expand isothermally from said third level to an intermediate pressure level between said third and said first pressure levels to thereby produce engine output power, said gas contained in said foam expanding substantially isothermally;

a second defoaming unit having an inlet coupled to said foam outlet of said first expansion engine to receive said foam at said intermediate pressure level and for separating said gas from said liquid of said foam while maintaining said separated gas at said intermediate pressure level, said second defoaming unit having a gas outlet configured for withdrawal of said separated gas and a liquid outlet configured for withdrawal of said separated liquid; and

a second expansion engine having a gas inlet and a gas outlet, said gas inlet of said second expansion engine being coupled to said gas outlet of said second defoaming unit to receive said separated gas therefrom at substantially said intermediate pressure, said second expansion engine allowing said received gas to expand adiabatically from said intermediate pressure level to a pressure level close to said first pressure level to thereby produce engine output power.

4,041,709

THERMAL POWER PLANTS AND METHOD OF OPERATING A THERMAL POWER PLANT

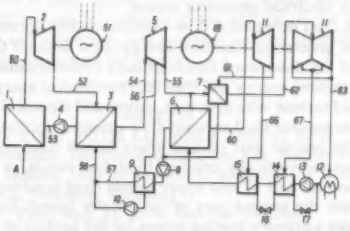
Gundolf E. Rajakovics, Vienna, Austria, assignor to Vereinigte Edelstahlwerke Aktiengesellschaft, Vienna, Austria

Continuation of Ser. No. 480,898, June 19, 1974, abandoned. This application Feb. 3, 1976, Ser. No. 654,961

Claims priority, application Germany, June 22, 1973, 2331741; Austria, Feb. 27, 1974, 1623/74

Int. Cl.[2] F01K *23/04*

U.S. Cl. 60—655 **4 Claims**



1. A ternary power plant comprising a primary alkali metal energy conversion circuit utilizing an alkali metal as its working medium, a steam energy conversion circuit utilizing water as its working medium, an intermediate energy conversion circuit operatively interposed between said alkali metal circuit and said steam circuit, said intermediate circuit having as its working medium an organic substance which is incapable of vigorously reacting with either said alkali metal or water and is operating between an upper operating temperature and a condensing temperature, first heat transfer means interposed between said alkali metal circuit and said intermediate circuit to effect heat transfer between the working media thereof, and second heat transfer means interposed between said intermedi-

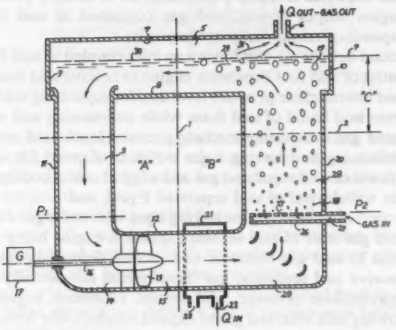
ate circuit and said steam circuit to effect heat transfer between the working media thereof, the upper operating temperature of said working medium of said intermediate circuit being within the range between about 420° and 480° C.

4,041,710

HYDRAULIC PRIME MOVER DEVICE

Robert August Kraus, and Edmund Josef Kraus, both of 14160 Redhill No. 39, Tustin, Calif. 92680

Filed Sept. 9, 1976, Ser. No. 721,849
Int. Cl.² F01K *25/06*
U.S. Cl. 60—673 **2 Claims**



1. A hydrodynamic prime mover device consisting of a closed, vertically oriented fluid recirculation system, utilizing a non-compressible fluid as a working medium and consisting of: a first vertically oriented fluid duct means and a second vertically oriented fluid duct means being laterally connected with each other at their uppermost and their lowermost portion in such a way as to assure a fluid flow from one into the other;

which fluid recirculation system has a fluid downward flow-oriented section, as well as a fluid upward flow-oriented section;

wherein said fluid downward flowing section comprises part of said upper lateral fluid conduit, said first vertical fluid duct means and part of said lower lateral fluid conduit;

and wherein the part of said lower lateral fluid conduit includes a hydraulic-turbine being connected via shaft to an electrical generator means;

which fluid downward flow-oriented section serves the function of generating electrical energy, first through the conversion of the downward flowing fluid's hydrodynamic potential into kinetical energy and then into mechanical energy by driving said turbine which, in turn, drives said electrical generator;

whereas said fluid upward flow-oriented section comprises the second part of said lower lateral fluid conduit, said second vertically oriented fluid duct means, as well as the second part of said upper lateral fluid conduit;

wherein the second part of said lower lateral fluid conduit includes a primary heating means for the heating of the turbine exhausted fluid and the maintenance of the operating temperature thereof, having a separate heating fluid inlet and a separate heating fluid outlet;

and wherein said second vertically oriented fluid duct means includes a gas inducer means at its lowermost effective portion for the induction of a cooled gas at liquid state into the heated upward flowing fluid, as well as including said second part of said upper lateral fluid conduit, which, in the whole, is a hermetically sealed fluid gas separator having a gas outlet at its uppermost portion and a substantial vertical space between the therethrough flowing fluid's surface and the inner upper containment wall;

which upward flow-oriented section serves the function of lifting the turbine exhausted and heated fluid back to its initial potential through the heat absorption of said induced cooled gas in contact with said heat fluid and its subsequent evaporation and expansion therein;

which expanded gas, by virtue of its fluid displacing action, gives rise to the lowering of the gas-containing fluid mass's specific gravity within the device's vertical riser, in contrast to the specific gravity of the gasless downward flowing fluid within the device's penstock;

thus, in turn, giving rise to the establishment of a difference in the hydrodynamic potentials between the downward and the upward flowing fluid respectively;

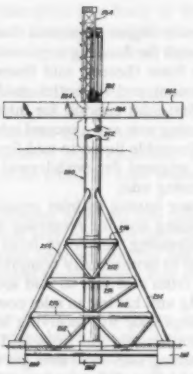
which, in turn, keeps the recirculating fluid in motion as long as a steady supply of thermal energy and a steady flow of cooled gas is made available to said device.

4,041,711

METHOD AND APPARATUS FOR QUICKLY ERECTING OFF-SHORE PLATFORMS

Joseph E. Lucas, Caracas, Venezuela, assignor to Marine Engineering Co., C.A., Caracas, Venezuela

Division of Ser. No. 353,665, April 23, 1973, Pat. No. 3,876,181.
This application Jan. 23, 1976, Ser. No. 543,350
Int. Cl.² E02B *17/04*; B66F *1/00*
U.S. Cl. 61—91 **29 Claims**



1. The method of quickly elevating a drilling and production platform on a support including at least one bottomed, upright caisson, comprising the steps of: floating the platform which is formed with at least one caisson well open at one side of the platform into a position about said one caisson so that the caisson is received within said open caisson well; then placing a jacking head on the upper end of at least said one caisson; and then incrementally exerting a downward pull on at least said one jacking head and an upward pull on the platform to successively elevate the platform on at least said one caisson.

4,041,712

METHOD FOR REDUCING WATER LOSS THROUGH SOIL BY SEEPAGE

George Stepien, Jr., Montclair, N.J.; Frank L. Califano, deceased, late of Hackensack, N.J.; William DeLorenzo, Jr., co-executor; G. Bruce Gillard, co-executor, both of Hackensack, N.J.; Thomas E. Russell, deceased, late of Whippany, N.J., and by Florence P. Russell, executrix, Whippany, N.J., assignors to The Flintkote Company, Stamford, Conn.

Continuation-in-part of Ser. No. 457,969, April 4, 1974, Pat. No. 3,891,586, which is a division of Ser. No. 296,114, Oct. 10, 1972, Pat. No. 3,831,382. This application May 14, 1975, Ser. No. 577,209

Int. Cl.[2] E02D *3/14*

U.S. Cl. 61—36 R 5 Claims

1. A process for creating a semi-permeable, subsurface barrier for reducing the loss of water by seepage through permeable soils comprising the steps of: applying to the surface of said soils, a composition comprising:

a. a 15 to 50% weight aqueous, cationic emulsion of a petroleum asphalt having a softening point of 90°to 200° F. and a penetration at 77° F. of from 4 dmm to 205 dmm, ninety percent of the particles of asphalt being less than about 10 microns in size;

b. a cationic emulsifier in from 0.15 to 0.75 percent by weight of said emulsion;

c. a non-ionic surface active agent in from 3.0 to 7.5 percent by weight of said emulsion selected from the group consisting of alkyl aryl polyether alcohols, polyethoxylated nonylphenols (average ethylene oxide content of 4–12 mols per mol of nonylphenol), benzyl ethers of octyl phenol and linear organic alcohols;

d. from 1.0 to 10.0 percent by weight of said emulsion of an elastomeric material; and

e. an acid in sufficient quantity to set the pH of said composition at from 3 to 7, and thereafter flooding said surface with water to force said emulsion downward into said soil to form a tough, flexible water-impervious mass below said surface.

4,041,713

METHOD AND APPARATUS FOR STARTING A TUNNELING MACHINE FROM AN INITIAL PLACEMENT WITHIN A VERTICAL SHAFT SUNK INTO THE GROUND AND PROVIDED WITH A STARTING PORT

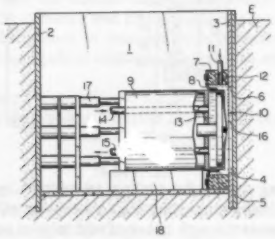
Yasuyuki Iwamitsu, Ichikawa, and Kataro Taira, Tokyo, both of Japan, assignors to Tekken Construction Co. Ltd., Tokyo, Japan

Filed Oct. 8, 1976, Ser. No. 730,866

Claims priority, application Japan, Mar. 8, 1976, 51-24076

Int. Cl.[2] E01G *3/04*

U.S. Cl. 61—42 17 Claims



1. A method of starting a propulsion of a tunneling machine into a soft ground from a vertical shaft at the starting point beyond a retaining wall of the shaft, which comprising steps of

a. providing a second wall having a starting port for the machine inside said retaining wall at a position from where the machine is propelled into the ground,

b. defining a liquid-tight chamber inside the shaft at said starting port with the head part of the machine placed substantially in the starting port,

c. feeding a liquid to said liquid-tight chamber under a pressure at least equal to a pressure applied to the retaining wall from the ground,

d. removing the retaining wall out of the starting port to expose the ground and apply said pressure in the liquid-tight chamber to the exposed ground, and

e. propelling the machine into the ground.

4,041,714

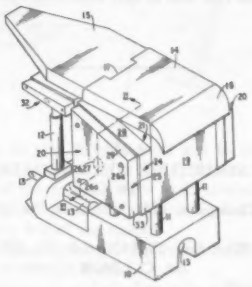
MINE ROOF SUPPORTS

Archelaius Dawson Allen, Leyland, England, assignor to Gullick Dobson Limited, England

Filed Sept. 26, 1975, Ser. No. 617,108

Int. Cl.[2] E21D *15/44*

U.S. Cl. 61—45 D 18 Claims



1. A mine roof support comprising a base structure, hydraulically extensible prop means mounted on said base structure, a roof-engaging structure including a canopy mounted on said prop means and having an upper roof-engaging surface for application thereby to a roof to be supported, a laterally extensible and retractable auxiliary canopy positioned on at least one side of the support below said upper roof-engaging surface, mounting means connecting said auxiliary canopy to said at least one side of said support for permitting pivotal movement of said auxiliary canopy relative to the vertical, and a device for urging and extending said auxiliary canopy laterally outwardly with respect to the support.

4,041,715

PIT PROP WITH LIFTABLE FRONT END

Willy Watermann, Dortmund-Berghofen, and Walter von der Linden, Hoesel, both of Germany, assignors to Klockner-Werke AG, Duisburg, Germany

Filed Aug. 31, 1976, Ser. No. 719,144

Claims priority, application Germany, Sept. 9, 1975, 2540048

Int. Cl.[2] E21D *15/44*

U.S. Cl. 61—45 D 10 Claims

1. A pit prop comprising:

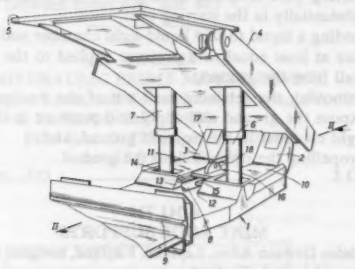
a floor-engaging foot slidable toward and away from a relatively fixed support in a predetermined direction;

a main link having a front end pivoted on said support and a rear end pivoted on said foot and slidable therealong generally parallel to said direction;

a displacement ram extending between said main link and said foot and expansible and contractile in said direction, whereby expansion and contraction of said displacement ram moves said foot relative to said support in said direction;

a secondary link having a front end pivoted on said rear end

of said main link and having a rear end bearing downwardly on and slidable along said foot; and



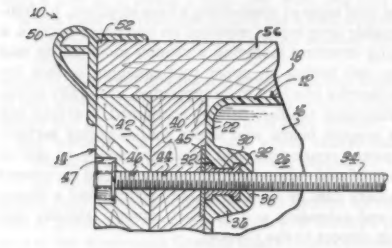
a lifting ram pivoted on said rear end of said main link above said secondary link and pivoted on said rear end of said secondary link, whereby expansion of said lifting ram urges said rear end of said main link upwardly.

4,041,716

SUPPORT STRUCTURE FOR A FLOATABLE MARINE DOCK

Thomas L. Thompson, 1531 Monrovia, Newport Beach, Calif. 92663

Filed Aug. 29, 1975, Ser. No. 608,880
Int. Cl.² B63B 35/00
U.S. Cl. 61—48 **4 Claims**



1. A support structure for a floatable marine dock comprising:

a floating cell defining a sealed, buoyant housing having end walls, a top wall, a bottom wall and side walls formed from a high-density-polyethylene material, wherein said side walls include a plurality of inwardly protruding jackets;

a plurality of support rods, each continuously threaded throughout the length thereof, each of said rods being threaded through oppositely aligned bushings, thereby forming a rigid structure therebetween, wherein each rod projects outwardly from said side walls thereof;

sealing means provided by said jackets for sealing engagement with said rods to prevent leakage within said cell;

a plurality of threaded bushings integrally formed within the side walls and molded within said jackets thereof, said bushings in one of said side walls being oppositely disposed to said bushings in said other side wall, and wherein opposite bushings are axially aligned with each other; and

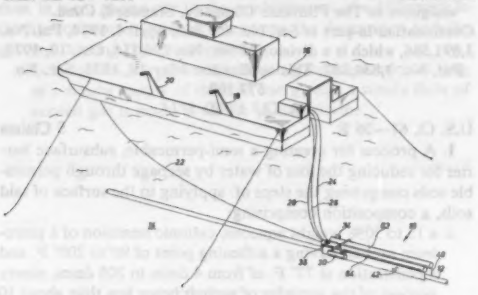
a dock-frame structure demountably attached to said projecting ends of said support rods.

4,041,717

SAND SHIELD JET SLED

Edwin J. Dressel, New Orleans, and Houston W. Hunter, Marrero, both of La., assignors to J. Ray McDermott & Co., Inc., New Orleans, La.

Filed July 21, 1976, Ser. No. 707,251
Int. Cl.² E02F 5/02, 1/00
U.S. Cl. 61—72.4 **21 Claims**



1. Apparatus for entrenching a submerged pipeline in a seabed, comprising:

a jet sled adapted to straddle the submerged pipe laying on the seabed, said jet sled having jet legs depending downwardly therefrom for forming a trench in the seabed for the pipeline;

an elongate member extending from the rear of the jet sled; and

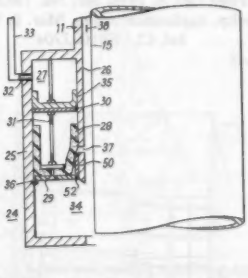
shields attached to said member and disposed on opposite sides of the unsupported portion of the pipeline extending from the surface of the seabed to the bottom of the trench, said shields preventing unconsolidated material from filling in the trench beneath the unsupported length of the pipeline.

4,041,718

SEALING DEVICES

William Bundy Stone, Houston, Tex., assignor to Deep Sea Grouting Packers, Inc., Gretna, La.

Continuation-in-part of Ser. No. 523,803, Nov. 14, 1974, Pat. No. 3,967,456. This application Mar. 24, 1976, Ser. No. 670,064
Claims priority, application United Kingdom, Mar. 24, 1975, 12209/75
Int. Cl.² E02D 5/52; F16J 15/40
U.S. Cl. 61—86 **22 Claims**



1. A sealing device for sealing an annular space disposed between a tubular supporting leg or a tubular piling can and a pile which passes through either of said tubular supporting legs or said tubular piling can, said tubular supporting leg and tubular piling can supporting a permanent platform disposed above the sea, said sealing device comprising an annular housing which includes an annular protective guard, said annular housing containing an annular sealing element and said annular protective guard being disposed between said annular sealing

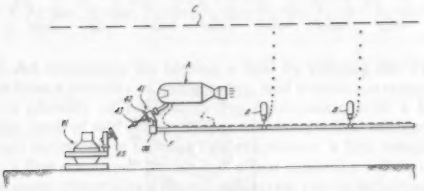
element and said pile before a seal is made with said pile, actuating means for causing relative axial movement between the annular protective guard and the annular sealing element, said axial movement releasing the annular sealing element whereby the annular sealing element moves into direct sealing contact with the pile and a plurality of support members pivotally connected to the body of the device adjacent the lower end portion of said sealing element, said support members having a length greater than the distance between the annular housing of the sealing device and the tubular piling and lying between the sealing element and the guard before said relative movement is effected and being released by said relative movement to yield into contact with the pile and support the sealing element against excessive deformation or rupture under pressure.

4,041,719

METHOD AND APPARATUS FOR CONNECTING SUBMARINE PIPELINES

Benton F. Baugh, Houston, Tex., assignor to Vetco Offshore Industries, Inc.

Filed Apr. 19, 1976, Ser. No. 678,147
Int. Cl.[2] F16L *1/00*
U.S. Cl. 61—110 **1 Claim**



1. A method of laying a pipeline on an offshore water bottom, comprising the steps of:

a. connecting lengths of line pipe end-to-end onshore to form a partial segment of the pipeline;
b. securing one end of such partial segment to a submersible power vessel;
c. connecting remotely actuatable submersible buoys to said segment for supporting it either at the water surface or at some desired depth beneath the surface;
d. connection additional lengths of pipe to the partial segment at the shore end to form a continuous pipeline until the desired length is reached;
e. connection additional remotely actuatable buoys to said pipeline segment to support the additional lengths of line pipe as needed;
f. submerging the pipeline beneath the water surface;
g. towing the submerged pipeline into position offshore with the submersible vessel;
h. submerging said pipeline and said submersible vessel to a position near the bottom of the water body;
i. guiding the offshore end of the pipeline segment with the submersible vessel to connect such offshore end with a pre-existing pipeline connection apparatus near the water bottom;
j. submerging the pipeline to the bottom; and
k. releasing the pipeline from the remotely actuatable buoys.

4,041,720

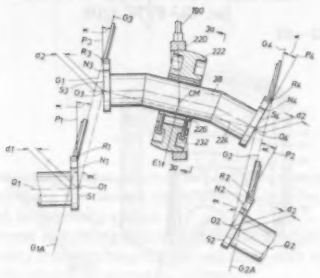
METHOD AND APPARATUS FOR INSTALLING A SPOOL BETWEEN TWO MISALIGNED PIPE SECTIONS

Maurice P. Lebourg, 3700 Greenway Plaza, No. 428, Houston, Tex. 77027

Filed Feb. 2, 1976, Ser. No. 654,411
Int. Cl.[2] F16L *1/00*
U.S. Cl. 61—110 **25 Claims**

1. A method for installing a spool fabricated to fit between the circular ends of two pipeline sections to define corresponding pipeline and spool faces when joinder is complete, said ends of the two pipeline sections being disposed such that the centers of the pipeline section ends can be connected by an imaginary line segment which does not intersect the wall of either pipeline section, and which pipeline ends lie in intersecting planes comprising the steps of:

orienting the spool for insertion between the pipeline ends such that the corresponding points on the mating spool and pipe end faces define parallel lines, and imaginary line segments may be extended from the center of each pipeline section end to the center of the corresponding spool end to which it is to be joined without intersecting the wall of the pipelines or the spool;



affixing guides to said pipeline ends and to the spool end defining planes parallel to the line of intersection between the planes of the pipeline ends and parallel to the line segments between the centers of the pipeline end and the corresponding end of the spool;

said guides extending beyond the perimeter of the pipeline ends and of the spool ends;

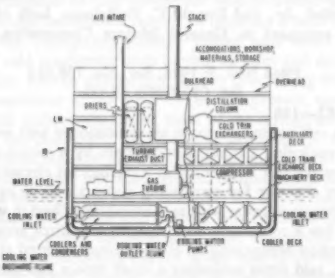
engaging the guides on said pipeline ends with the guides on the corresponding ends of the spool; and moving said spool into mating position with said pipeline section ends so that all the points on the spool travel along lines parallel to the planes of said guides while maintaining said guides in engagement.

4,041,721

VESSEL HAVING NATURAL GAS LIQUEFACTION CAPABILITIES

Ludwig Kniel, Scarsdale, N.Y., assignor to The Lummus Company, Bloomfield, N.J.

Filed July 7, 1975, Ser. No. 593,223
Int. Cl.[2] F17C *13/02*
U.S. Cl. 62—45 **3 Claims**



1. A vessel having natural gas liquefaction capabilities which comprises:

a hull divided by transversely disposed bulkhead means into a plurality of liquefaction compartments, said bulkheads being substantially water and fire-proof; and

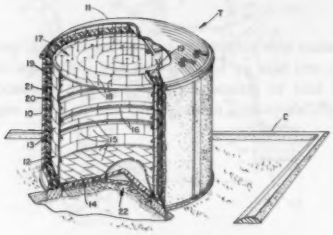
an integrated liquefaction assembly for liquefying natural gas disposed in each of said liquefaction compartments, said liquefaction assembly including compressors which are disposed transverse to the axis of said vessel with compressors of adjacent liquefaction assemblies having opposite senses of rotation.

4,041,722

IMPACT RESISTANT TANK FOR CRYOGENIC FLUIDS

John Terlesky, New Brighton; Hugh Emil Muller; John C. Murphy, both of Pittsburgh, and Harold F. Honath, Coraopolis, all of Pa., assignors to Pittsburgh-Des Moines Steel Company, Pittsburgh, Pa.

Filed Sept. 26, 1975, Ser. No. 617,109
Int. Cl.[2] F17C 3/06
U.S. Cl. 62—45 42 Claims



1. An impact resistant tank for storing cryogenic fluids, comprising: an inner tank of metallic material compatible with cryogenic temperatures and having a side wall, a bottom and a roof means; insulation means surrounding the side wall and positioned below the bottom and above the roof means for insulating the inner tank from ambient temperature; an impact resisting, free standing, reinforced concrete wall positioned in concentric, spaced relationship around said inner tank, said concrete wall extending at its upper end above the upper end of the inner tank side wall, said concrete wall being post-tensioned to increase the ability of the concrete to withstand cryogenic temperatures; an impact resisting, reinforced concrete bottom disposed in underlying relation to the inner tank bottom, said concrete wall protecting the inner tank wall from impact loads to maintain the liquid-containing integrity thereof, and said concrete bottom increasing the resistance of the inner tank bottom to impact loads thereon; and seal means on the inner surface and at the bottom edge of the reinforced concrete wall for containing cryogenic liquid in the event of a leak or rupture in the inner tank.

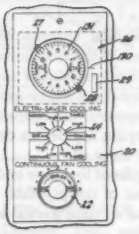
4,041,723

ROOM AIR CONDITIONER WITH TIMER

John Weibel, Jr., and Donald C. Ferdelman, both of Dayton, Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 3, 1976, Ser. No. 738,612
Int. Cl.[2] F25B 49/00
U.S. Cl. 62—126 3 Claims

1. In a self-contained room air conditioner unit including a housing enclosing a compressor driven by a motor, a condensor, an evaporator connected in a refrigerant circuit and a fan driven by a motor for circulating room air to be cooled into heat exchange relation with said evaporator; and in which said housing has a room-side section with a control area thereon; the invention comprising an electric timer located at said control area, said timer including a timer motor and timer switch electrically connected in a control circuit and a manually operable time preselector means to preset when said timer switch shall close and open by selecting start and stop times for selectively controlling the time of operation of said unit, said control circuit including first and second supply conductors adapted for connecting the compressor motor and the fan motor to a power source; thermostat switch means operative to cycle in response to the temperature of said circulating air; a multiposition manually operable cycle selector switch connected in said control circuit for selectively operating said unit in a timed cooling mode wherein said fan motor and said compressor motor are cycled on-and-off together by said thermostat switch means only during a timed period defined by starting and stopping times preselected by said timer preselector means; said cycle selector switch including timer shunt selective contact means, compressor motor selective contact means, and fan motor selective contact means; each said selective contact means having a movable contact side and a fixed contact side, said cycle selector switch having first terminal means in series connection between said first supply conductor and the movable contact side of said timer shunt selective contact means, said cycle selector switch having second terminal means common to the fixed contact side of each said selective contact means; said control circuit including as a compressor circuit portion thereof the compressor motor in series connection with said second terminal means, said fixed contact side of the compressor motor selector contact means, said movable contact side of the compressor motor selector contact

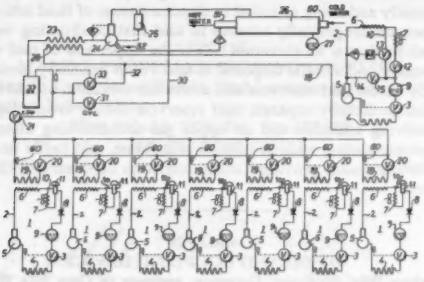


means, said thermostat switch means and said second supply conductor; said control circuit including as a fan motor circuit portion thereof the fan motor in series connection with said second terminal means, said fixed contact side of said compressor motor selector contact means, said movable contact side of said compressor motor selector contact means, said thermostat switch means, said fixed contact side of said fan motor selective contact means, said movable contact side of said fan motor selective contact means, and said second supply conductor; said timer motor having one side connected to said first terminal means and its other side connected to said second supply conductor whereby said timer motor runs continuously when said supply conductors are connected to said power source, said timer switch being connected between said first terminal means and said second terminal means, whereby upon manual operation of the movable contacts of said cycle selector switch to a predetermined position, said timer shunt selective contact means is electrically shunted in said control circuit by said timer switch which is electrically placed in series with said first and second terminal means to enable said unit to operate in said timed cooling mode for a time in accordance with the start and stop times preselected by said manually operable time preselector.

4,041,724
INSTALLATION FOR HEATING A FLUID, PREFERABLY WATER, IN A CONVENTIONAL CENTRAL HEATING SYSTEM, USING THE WASTE HEAT PRODUCED BY A NUMBER OF REFRIGERATORS

Berth Ulrik Gustafsson, Osterskar, Sweden, assignor to Projectus Industriprodukter AB, Stockholm, Sweden

Filed Jan. 20, 1976, Ser. No. 650,730
Claims priority, application Sweden, Feb. 18, 1975, 7501806
Int. Cl.[2] F25B *29/00*
U.S. Cl. 62—175 5 Claims



1. An installation for heating a fluid by utilizing the waste heat from a plurality of refrigerators, said installation comprising a plurality of refrigerators in combination with a heat pump, each of said refrigerators comprising a first refrigerant circuit including, in series, a first evaporator, a first compressor, a first condenser device and a first expansion valve, said heat pump comprising a second refrigerant circuit including, in series, a second evaporator device having expansion means, a second compressor and a second condenser, said heat pump being arranged to receive via said second evaporator device, the thermal energy from said first condenser device of the refrigerator, and to heat said fluid by heat exchange at said second condenser, said second evaporator device being arranged in the form of parallel-coupled evaporator units each of which is connected to an expansion valve controlled by the refrigerant temperature at the unit outlet; a first by-pass line including a valve, openable when said unit outlet pressure is reduced, arranged between the high pressure side of said second compressor and said second refrigerant circuit, following said second evaporator device; a second by-pass line having a valve controlled by the temperature at the inlet side of said second compressor, arranged in parallel with said second evaporator units being arranged in a heat exchanging relationship with its particular first condenser device of the refrigerators, said first condenser devices each comprising at least one additional condenser unit for the dissipation of the residual heat, a third by-pass line being arranged in parallel with said additional condenser unit, said third by-pass line having therein control means arranged to control the flow distribution between the condenser units as a function of the desired refrigerant pressure after the condenser device.

4,041,725
CONTROL SYSTEM FOR REFRIGERATION UNIT

David Garside, Rosemere, Canada, assignor to Galt Equipment Limited, Candiac, Canada

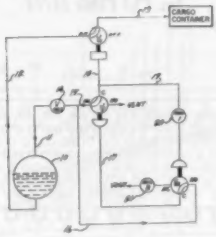
Filed Mar. 4, 1976, Ser. No. 664,026
Int. Cl.[2] F25D *25/00*
U.S. Cl. 62—223 11 Claims

1. In a refrigeration unit including a pressurized liquified gas reservoir and a gas pressure actuated flow valve for releasing the liquified gas, the improvement of a control system for metering liquified gas flow comprising:

a gas line from the liquified gas reservoir;

a first gas pressure actuated three-way valve having a normally closed port connected to the gas line, a normally opened port connected to vent, and a common port connected to the gas pressure actuator of the flow valve;

a second gas pressure actuated three-way valve having a common port connected to the gas pressure actuator of the first three-way valve, a normally opened port connected to the gas line, and a normally closed port connected to vent;



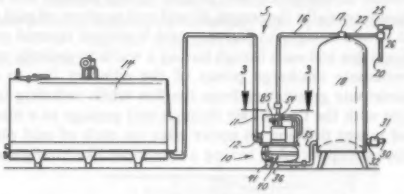
a first restricting means adapted to provide a first time delay for switching the second three-way valve from normally opened to normally closed;

and a second restricting means adapted to provide a second time delay for switching the second three-way valve from normally closed to normally opened.

4,041,726
HOT WATER SYSTEM

Paul Mueller, and Ray A. Prine, both of Springfield, Mo., assignors to Paul Mueller Company, Springfield, Mo.

Filed Mar. 29, 1976, Ser. No. 671,579
Int. Cl.[2] F25B *27/02*
U.S. Cl. 62—238 27 Claims



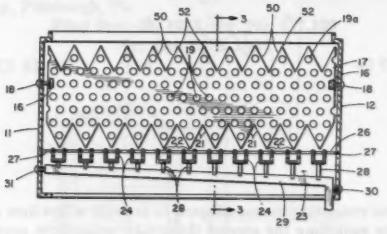
1. A hot water system for producing hot water within a preselected temperature range by use of controlled convection flow in combination with a refrigeration system, said hot water system comprising a refrigeration system including a water-cooled condenser having refrigerant passage means and water passage means associated therewith defining a heat exchange surface, the refrigerant passage means and water passage means of said condenser each having an inlet and an outlet, a compressor, and an evaporator, means connecting the output of the evaporator to the input of the compressor, means connecting the compressor to the input of the refrigerant passage means of the condenser, and means connecting the output of the refrigerant passage means of the condenser to the input of the evaporator, said hot water system further comprising a hot water tank having a hot water inlet near the top of the tank and a cold water outlet near the bottom and having a hot water outlet near the top of the tank and a cold water inlet near the bottom, means connecting the hot water inlet of the tank to the outlet of the water passage means of the condenser, means connecting the cold water outlet of the tank to the inlet of the water passage means of the condenser, means connecting the cold water inlet of the tank to a source of water to be heated, and a temperature responsive water flow restricting means in the connecting means between the outlet of the water flow passage of the condenser and the hot water inlet of the tank for

restricting water flow by convection below a preselected water temperature.

4,041,727
EVAPORATOR ASSEMBLY

Eugene Wendell Maudlin, York, Pa., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Sept. 2, 1975, Ser. No. 609,280
Int. Cl.² F25D *21/14*
U.S. Cl. 62—290 **1 Claim**

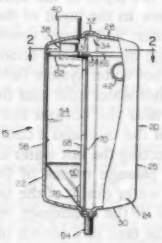


1. An evaporator coil assembly for use in an air conditioning system of the type in which the evaporator coil assembly is located within a plenum through which air to be conditioned is forced upwardly through said coil assembly comprising: an evaporator coil including a plurality of tube sections extending in at least two planes perpendicular to the direction of air flow; a plurality of substantially vertically arranged plate-like fins each lying in a plane parallel to the direction of air flow and being in heat exchange contact with substantially all the tube sections traversing said plane, each said fin having a lower edge providing V-shaped tapered portions with the apex thereof arranged at the lowermost condensate discharge point of each fin; a plurality of spaced parallel condensate-collecting troughs supported on said cabinet in said passage and extending substantially the length of said coil portions of said evaporator, said troughs underlying said V-shaped tapered portions of said fins and each trough having a width to underlie only the condensate discharge points of the adjacent fins to collect condensate gravitating from the fins while reducing interference with the flow of air through said passage to a minimum; and means defining an upper edge on each of said plate-like fins, said upper edge having a saw-tooth like configuration.

4,041,728
SUCTION ACCUMULATOR

Robert L. Morse, Adrian, Mich., and Sharon J. Hudson, Jr., Toledo, Ohio, assignors to Tecumseh Products Company, Tecumseh, Mich. and Sharon Manufacturing Company, Toledo, Ohio

Filed July 21, 1975, Ser. No. 597,584
Int. Cl.² F25B *43/00*
U.S. Cl. 62—503 **11 Claims**

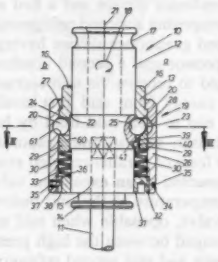


1. A refrigerant retention device comprising a suction accumulator or the like for a refrigerant compressing—evaporating system, said accumulator comprising in combination a pressure vessel, a vertically disposed weir member within said vessel, said vessel having first and second wall sections confronting said weir member on opposite sides of said weir member, said weir member forming a reservoir with said first confronting vessel wall section on one side of said weir member and an outlet flume with said second confronting vessel wall section on the other side of said weir member, a liquid metering aperture through the bottom of said weir member communicating said reservoir with said flume, a fluid inlet to the vessel entering into said reservoir, a fluid outlet from the vessel exiting from said flume, said fluid inlet being disposed generally horizontally and being oriented to direct a stream of fluid into said reservoir tangentially relative to said first confronting vessel wall section at an elevation below the upper end of said weir member and a baffle disposed in said vessel generally horizontally across said reservoir and above the elevation of said fluid inlet to thereby separate said reservoir into a lower, liquid-receiving chamber and an upper gas-accumulating chamber communicating with an inlet to said flume, said baffle having aperture means providing communication between said chambers.

4,041,729
OVERLAND COUPLING DEVICE

Reiner Bilz, Stuttgart, Germany, assignor to Otto Bilz Werkzeugfabrik, Ostfildern, Germany

Filed Feb. 25, 1976, Ser. No. 661,168
Claims priority, application Germany, Mar. 14, 1975, 2511148
Int. Cl.² F16D *3/56*
U.S. Cl. 64—29 **29 Claims**



1. An overload coupling device for thread-cutter - chucks, quick-change inserts therefor, and the like, said device comprising a cylindrical sleeve loadable with the rotational drive moment; a drive shank drivable by means of the drive sleeve and held coaxially and rotatably within the latter, said shank having a mounting for the rotation-fast retention of a tap drill; a torque coupling with adjustable tripping torque seated in the force-transmission parts between drive sleeve and drive shank, said coupling being formed as spring-loaded ball-pocket coupling with at least one coupling ball, the drive sleeve being axially non-displaceably held on the drive shank and provided with at least one opening open in the axial direction on one axial end face and serving for the reception of said coupling ball, the angular width of said opening being at least as great as the coupling ball diameter, the drive shank in the axial region of the opening comprises a ball-pocket of a diameter smaller than the diameter of the coupling ball for the reception of the coupling balls, said opening being formed as cage slots which are inwardly and outwardly open in the radial direction and the axial extent of which is less than the coupling ball diameter, the cage slots being inclined toward the working drive direction of the drive sleeve, the ball-pockets being arranged on the outer peripheral surface of the drive shank facing the drive sleeve; a cylindrical closure sleeve coaxially enclosing the drive sleeve and the drive shank being axially non-displaceably held on the drive sleeve and possessing in the axial region of

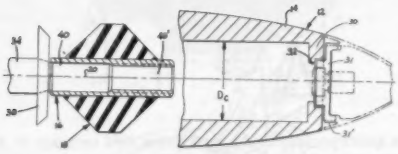
the cage slots in the interior an annular groove the bottom of which extends at a radial distance corresponding at least to the coupling ball diameter from the peripheral surface of the drive shank; and in the annular space between drive shank and closure sleeve on the axial side of the coupling balls remote from the bottom of the cage slots a thrust ring which is pressabie axially in the direction towards the cage slots and against the coupling balls by means of thrust springs adjustably supported on the closure sleeve the two mutually opposite walls of each cage slot considered in a diametric plane at right angles to the longitudinal central axis each extending along a secant of the peripheral circle of the drive shank and of the drive sleeve and parallel to and with spacing from a diameter of said peripheral circle.

4,041,730

MARINE PROPELLER BUSHING COUPLING

Robert F. Kress, Grand Rapids, Mich., assignor to Dana Corporation, Toledo, Ohio

Filed Feb. 11, 1976, Ser. No. 657,258
Int. Cl.² F16D 7/02
U.S. Cl. 64—30 D **2 Claims**



1. A marine propulsion drive coupling bushing assembly, comprising an outer housing, an inner sleeve, and an annular rubber bushing within said housing and around said sleeve; said housing, sleeve and bushing being symmetrical about a central axis of rotation, said housing forming an inner chamber, and having a substantially cylindrical inner engagement surface of diameter D_C surrounding said inner chamber; said sleeve havin an outer surface of diameter D_S spaced radially inwardly of said housing inner engagement surface to define an annular chamber therebetween; said annular bushing having an inner surface bonded to said sleeve outer surface, and having a free configuration substantially trapezoidal in cross section on a radial plane, the base of the trapezoid being at said bushing inner surface; said bushing free configuration having a diameter D_B with the following relationship to diameters D_C and D_S:

$$\left(\frac{D_C^2 - D_S^2}{D_B^2 - D_S^2}\right) = \text{about } 0.4 \text{ to } 0.6$$

and said bushing, in its assembled condition in said annular chamber between said chamber inner surface and said sleeve outer surface, having a diameter equal to diameter D_C.

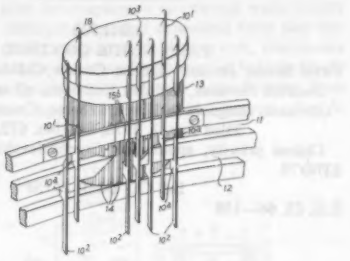
4,041,731

PATTERNING UNITS FOR CIRCULAR KNITTING MACHINES

Herbert York, Great Glen, England, assignor to Kroy Knitting Developments Ltd. and B.Y. (Simulated Furs) Limited, both of Kent, England

Filed Dec. 16, 1975, Ser. No. 641,173
Claims priority, application United Kingdom, Dec. 24, 1974, 55798/74
Int. Cl.² D04B 15/74
U.S. Cl. 66—50 B **4 Claims**

1. In combination a patterning unit and a circular knitting machine having a rotatable needle cylinder, the patterning unit comprising an outer cylindrical pattern drum which is axially tricked around its periphery, the tricks being circumferentially spaced apart at the same pitch as the knitting instruments in the needle cylinder of the knitting machine, the drum being rotatable about an axis which is paralled to the knitting instruments in the cylinder, by way of all the needles in the needle cylinder which engage in tricks of the drum, a plurality of individually slidable selector elements arranged to function within predetermined ones only of the axial tricks in accordance with patterning requirements, a relatively fixed core-like inner component of cylindrical form housed within the rotatable outer



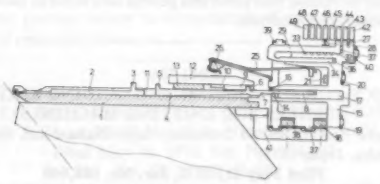
drum, a suitably contoured cam formation surrounding said core-like inner component and adapted, by co-operation with complementary formations on the selector elements, to impart to the latter axially directed sliding movements to and fro within the tricks, the slidable selector elements being set out in the tricks in the rotary outer cylindrical pattern drum in a predetermined manner dictated by the required pattern area and the relative sizes of the knitting machine needle cylinder and the patterning unit itself.

4,041,732

STRAIGHT AND CIRCULAR KNITTING MACHINE

Erich Krause, Bopfingen, Germany, assignor to Universal Maschinenfabrik Dr. Rudolf Schieber KG, Westhausen, Germany

Filed Mar. 31, 1976, Ser. No. 672,356
Claims priority, application Germany, Apr. 8, 1975, 2515201
Int. Cl.² D04B 7/00, 15/66
U.S. Cl. 66—75.2 **16 Claims**



1. A straight knitting machine comprising: a needle bed, needle means carried by said needle bed, a slide, cam means carried by said slide for selectively actuating said needle means for carrying out casting-on, loop-forming and stitch transfer, by lowering or lifing the needle means into or out of the needle bed so that a foot of each needle means completely or partially projects from the needle bed or is withdrawn completely into the needle bed, spring means for raising said needle means, rows of pressure strips for pressing the needle means into the needle bed, said pressure strips being mounted for staggered displacement on said slide which carries said cam means, a selector element selectively adjustable in several stages with respect to each row of said pressure strips and being operatively associated with each slot in the needle bed for transmitting control movements from the pressure strips to each needle means, intermediate members, each needle means comprising a shaft, the shaft of said needle means being mounted in a respective intermediate member without clearance above and blow, at least some of said intermediate members having feet ar-

ranged in a plurality of rows for engagement by one or more of said pressure strips said feet being immovably arranged on at least some of said intermediate members, and at least on movable foot being provided on each intermediate member for movement selectively into different row, the position at which the intermediate members in a needle compartment of the knitting machine are inserted being non-alterable, said cam means having no displaceable lifting parts for moving the needle means.

4,041,733

YARN GUIDE CONTROL

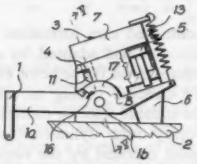
Pavel Brada; Jaromir Kučera; Otokar Chládek; Gustav Voda; Jindřich Nováček, and Jan Kollmann, all of Trebic, Czechoslovakia, assignors to Elitex, Liberec, Czechoslovakia

Filed Apr. 2, 1976, Ser. No. 672,844

Claims priority, application Czechoslovakia, Apr. 3, 1975, 2270/75

Int. Cl.² D04B *15/58*

U.S. Cl. 66—138 **5 Claims**



1. In a multifeed circular knitting machine apparatus for controlling the movement of a yarn guide secured at the end of a lever for pivotal movement between an inoperative and operative position comprising spring means for normal biasing said lever in the operative position, a first pneumatical piston actuable on said lever to selectively move said lever against said bias in response to a pneumatic impulse, a second pneumatic piston having a pawl, a recess formed in the lever at a position corresponding to said pawl when said lever is moved into the inoperative position, and spring means biasing said second piston to cause said pawl to normally engage said lever, said second piston being operable on receipt of a pneumatic impulse to release said pawl and permit said lever to move into the inoperative position.

4,041,734

DEVICE FOR SUPPORTING AND GUIDING KNITTING NEEDLES FOR KNITTING MACHINES

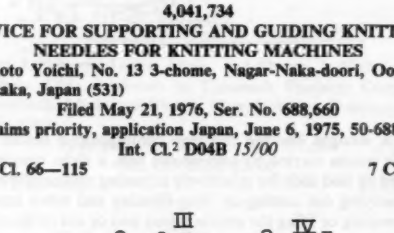
Inamoto Yoichi, No. 13 3-chome, Nagar-Naka-doori, Ooyodo, Osaka, Japan (531)

Filed May 21, 1976, Ser. No. 688,660

Claims priority, application Japan, June 6, 1975, 50-68809

Int. Cl.² D04B *15/00*

U.S. Cl. 66—115 **7 Claims**



1. A device for supporting and guiding knitting needles for use in a knitting machine comprising a needle bed having needle grooves for receiving the stems of knitting needles and to guide advance and retraction movements of the needles, the needle grooves being arranged side-by-side and provide in two rows in front and rear regions of the needle bed respectively with respect to the direction of the advance and retraction movements, at least the needle grooves in the front region being interconnected by flat wall surfaces and the needle grooves in one of the regions being out of alignment with the needle grooves in the other region and offset in a direction perpendicular to the direction of the movement, the stems of the knitting needles being alternatively insertable in the needle grooves of the rear region when in a position of use extend over the flat surface of the walls between the needle grooves of the front region.

4,041,735

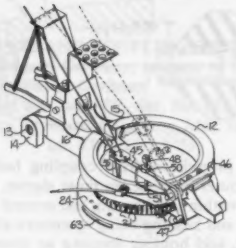
AUXILIARY KNITTING STATION FOR HOSIERY KNITTING MACHINE

Otis W. Holder, Mount Airy, N.C., assignor to Oakdale Knitting Company, Mount Airy, N.C.

Filed Aug. 27, 1976, Ser. No. 718,364

Int. Cl.² D04B *15/54*

U.S. Cl. 66—133 **8 Claims**



1. In a circular hosiery knitting machine including a needle cylinder, a circle of latch needles supported for vertical movement in said needle cylinder, a latch ring surrounding the upper end of said circle of latch needles, a sinker bed supported on said needle cylinder and containing radially movable sinkers, each of said sinkers including a lower ledge for forming body yarn stitch loops and an upper ledge for forming terry loops, and a main knitting station including yarn feed fingers supported for movement into and out of yarn feeding position in said latch ring, the combination therewith of an auxiliary knitting station comprising

a. auxiliary stitch cam means movable between operative and inoperative positions adjacent said needle cylinder and spaced from said main knitting station,

b. an auxiliary yarn feed finger sufficiently thin to be selectively movable between a lowered or active position between said latch ring and said circle of needles and a raised or inactive position above the circle of needles, said auxiliary yarn feed finger comprising

1. a relatively flat, substantially vertically disposed main body portion including a lower end positioned below the level of said upper ledges of said sinkers and closely adjacent said lower ledges of said sinkers when said auxiliary yarn feed finger is in said active position,

2. first yarn guide means adjacent said lower end of said main body portion for feeding a first yarn to said needles at a level below said upper ledges of said sinkers, and

3. second yarn guide means spaced above said first yarn guide means for feeding a second yarn to said needles at a level above the level of said upper ledges of said sinkers,

c. control means attached to the upper end portion of said main body portion of said auxiliary yarn feed finger and extending above said latch ring for controlling movement

of said auxiliary yarn feed finger between said active and inactive positions, and

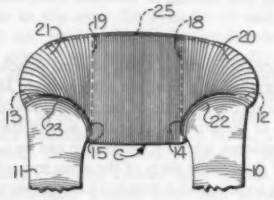
d. sinker cam means positioned at said auxiliary knitting station and being engageable with said sinkers for moving the same outwardly in advance of said auxiliary yarn feed finger so that said upper ledges of said sinkers may pass said auxiliary yarn feed finger and for moving said sinkers inwardly immediately after they pass said auxiliary yarn feed finger.

4,041,736

LOWER BODY GARMENT AND METHOD OF MAKING SAME

Oscar Fregeolle, Hickory, N.C., assignor to Pilot Research Corporation, Valdese, N.C.

Filed Oct. 16, 1973, Ser. No. 406,813
Int. Cl.[2] A41B 9/00, 11/00
U.S. Cl. 66—177 **12 Claims**



1. A seamless knit lower body garment comprising a pair of seamless tubular leg portions and a panty portion connecting the two leg portions and having a waist opening extending across the upper edge thereof, said panty portion including a central body portion knit of full courses extending from the waist opening in the front of said garment to the waist opening in the rear of said garment and between said leg portions to provide a crotch area, and a single reciprocatorily knit fashioned body gusset on each side of said central body portion, one of said fashioned body gussets being integrally knit with one side of said central body portion and being formed solely of narrowed partial courses, the other of said fashioned body gussets being integrally knit with the other side of said central body portion and being formed solely of widened partial courses, and the partial courses of each of said body gussets having opposed ends joined directly to the adjacent complete courses of said leg portions along corresponding gore lines.

7. A method of making a seamless knit lower body garment comprising the successive steps of knitting a plurality of complete courses to form a first seamless tubular leg portion, reciprocatorily knitting a plurality of partial courses to form a first body gusset while fashioning to increase the width of the body gusset, knitting a plurality of full courses to form a central body portion integrally knit with the first body gusset and defining a crotch area, reciprocatorily knitting a plurality of partial courses to form a second body gusset while fashioning to reduce the width of the second body gusset, and knitting a plurality of complete courses to form a second tubular leg portion integral with the second body gusset.

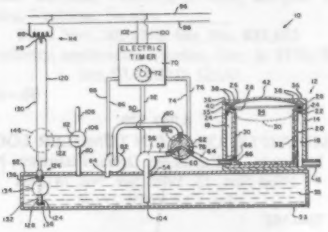
4,041,737

CLOTHES WATER EXTRACTING MACHINE

Saturno Angelo Masci, Bedford, Mass., assignor to Walter J. Kreske, Newton, Mass.

Filed Feb. 25, 1974, Ser. No. 445,801
Int. Cl.[2] D08F 47/00
U.S. Cl. 68—242 **5 Claims**

1. In a laundry clothes water extracting machine of the type having a flexible diaphragm with an outer and inner surfaces and the inner surface forming a receptacle for receiving wet clothes for extraction of water therefrom, a water storage reservoir, pump means for pressurably applying the reservoir water from said reservoir about the outside surface of the diaphragm to thereby cause the diaphragm to compress against the clothes and squeeze the clothes water therefrom and thereafter return the reservoir water to the reservoir, and said pump means having a reservoir water intake opening positioned at a depth in said reservoir such that under normal non-leaking operating conditions said intake opening will continue to be immersed in said reservoir water below the reservoir water level reached when the amount of water remaining in said reservoir has been diminished by the amount of reservoir water applied against said diaphragm, the combination of a water valve having an inlet for coupling to an external water supply source which is different from that exhausted from said diaphragm and an outlet coupled to said reservoir, electrically energizable means coupled to said water valve for selectively opening and closing said water valve to flow of water from said external water supply source to said reservoir, electric



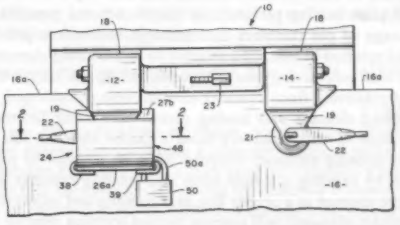
circuit means coupled to said electrically energizable means for applying electrical energy from an electric power source to said electrically energizable means, and a reservoir float operable switch in said electric circuit means positioned with both said switch and float in said reservoir for creating a closed electric circuit between said electric power source and said electrically energizable means at a first water level in said reservoir which is above said reservoir water intake opening and below said diminished reservoir water level and creating an open circuit between said electric power source and electrically energizable means at a second water level in said reservoir to supply additional water from said external water supply to a level which is above said first reservoir water level which leaves sufficient remaining capacity in said reservoir for the return of reservoir water applied against said diaphragm to thereby prevent injury to components of said machine from lack of reservoir water.

4,041,738

LOCKING DEVICE FOR OUTBOARD MOTOR

Stephen R. Vann, 20160 Van Owen, Canoga Park, Calif. 91306

Filed May 10, 1976, Ser. No. 684,553
Int. Cl.[2] F16B 41/00
U.S. Cl. 70—212 **12 Claims**



1. A locking device for an outboard motor having a C-shaped mounting bracket fitting over the back transom of a boat and containing a mounting screw with a handle at one end and a foot at the other end, said locking device comprising:

a first member having two angularly positioned arms, one of said arms extending outwardly from said transom and the other of said arms being held adjacent said transom by said foot;

a second member having a first portion, a handle restraining portion extending from said first portion and shaped to prevent rotation of said handle; guide means for slidably connecting said first portion of said second member and said one arm of said first member; and

lock means for securing said one arm to said first portion in various relative positions, said lock means locking said members together in a relative position with said other arm adjacent said transom and said restraining portion adjacent said handle to prevent rotation of said handle.

4,041,739

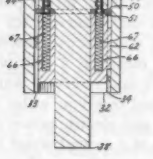
MULTIPLE AXIAL PIN TUMBLER LOCK

Leonard Mercurio, 34 Beaumont Drive, Plainview, N.Y. 11803

Filed Nov. 15, 1976, Ser. No. 741,892

Int. Cl.[2] E05B 27/08

U.S. Cl. 70—363 **2 Claims**



1. In a multiple axial pin tumbler lock including an outer housing element adapted to be engaged in non-rotational relation relative to a supporting structure, a rotating cylinder element including a rearwardly projecting shaft for actuating a latch, a relatively fixed cylinder element axially aligned with said rotating cylinder element, and a plurality of split pin tumblers engaging bores in said rotating and relatively fixed cylinder elements to immobilize said rotating cylinder element, said pins defining a parting line which is aligned with an edge of said rotating cylinder upon insertion of a key engaging the outer ends of said pins, the improvement comprising: a thin plate having first and second planar surfaces abutting a planar surface of each of said rotating and fixed cylinder elements, said plate having peripherally disposed bores permitting the passage of pin tumblers therethrough and means preventing axial rotation of said plate relative to said housing element; said pin tumblers having annular recesses along the length thereof, said relatively fixed cylinder element being positioned in said housing element and having means permitting limited axial rotation of said relatively fixed cylinder element relative to said housing element; whereby upon an attempt to pick said lock by exerting a torque upon said rotating cylinder element in the absence of a proper key, said rotating and relatively fixed cylinder elements will execute limited rotation relative to said plate, resulting in disalignment of the peripherally disposed bores thereof with respect to corresponding bores in said fixed cylinder element, the edges of said bores in said plate engaged at least some of the annular recesses in said pins to prevent axial movement thereof.

4,041,740

HAND TOOL

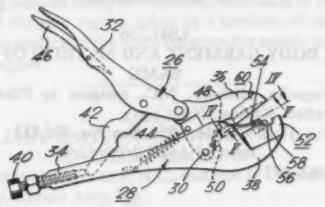
Francisco Villazon, Barcelona, Spain, assignor to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 30, 1976, Ser. No. 755,526

Claims priority, application United Kingdom, Jan. 17, 1976, 1845/76

Int. Cl.[2] B21D 9/08

U.S. Cl. 72—410 **4 Claims**



1. A hand tool comprising a pair of arms which are pivotally connected together at a position intermediate their ends, the parts of the arms on one side of the pivot constituting handles and the parts of the arms on the other side of the pivot constituting jaws between which a workpiece can be compressed by movement of the handle parts of the arms towards each other, and including a spring wire member having one end secured to an arm of the tool adjacent the pivot and extending away from the pivot between the jaw parts of the tool, the spring wire member being bowed outwardly of one arm towards the other arm, and having its free end extending through a guide on the one arm, the guide permitting movement of the spring wire member therethrough towards the free ends of the jaw parts, the bowed portion of the spring wire member being engageable by the other arm of the tool as the jaw parts of the tool approach each other, thereby to urge the spring wire member through the guide such that the free end of the spring wire member passes over a recess in the jaw part of said one arm of the tool before the jaw parts of the tool reach their most closed position.

4,041,741

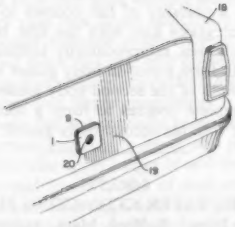
AUTOMOBILE TRUNK GUARD

Carlos U. Cintron, 8012 Bainbridge Road, Alexandria, Va. 22308

Filed Dec. 31, 1975, Ser. No. 645,926

Int. Cl.[2] E05B 63/00

U.S. Cl. 70—417 **2 Claims**



1. Apparatus for protecting a trunk lid and trunk lock of an automobile to prevent forceable entry into the trunk of the automobile comprising:

a first protective plate made of a substantially heavy gauge metal, said first protective plate having a hole located substantially in the center thereof and having first and second threaded studs secured to one of its surfaces and projecting away from said surface, said first and second

threaded studs being located on opposite sides of said hole and being spaced apart from said hole;

a resilient washer having substantially the same size and shape as said first protective plate and having a substantially centrally located hole of substantially the same diameter as said hole in said first protective plate, said resilient washer further having first and second holes located on opposite sides of said substantially centrally located hole of said resilient washer and spaced apart therefrom, said first and second holes in said resilient washer being located relative to said substantially centrally located hole in said resilient washer such that said first and second studs of said first protective plate will pass through said first and second holes of said resilient washer with said substantially centrally located hole of said resilient washer being aligned with said substantially centrally located hole in said first protective plate;

a second protective plate made of a substantially heavy gauge metal and having a substantially centrally located hole of sufficient diameter to permit said second protective plate to slip over the cylinder of said lock of said trunk lid and having first and second holes located on opposite sides of said substantially centrally located hole, said first and second holes in said second protective plate being so located relative to said substantially centrally located hole in said second protective plate that said first and second threaded studs will pass through said first and second holes of said second protective plate with the substantially centrally located hole in said second plate being substantially aligned with said substantially centrally located hole in said second plate when said first and second threaded studs are passed through said first and second holes in said second protective plate; and

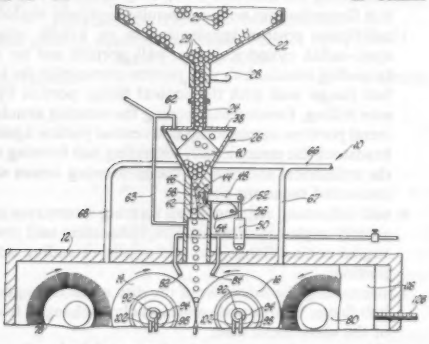
first and second nuts for securing said first protective plate to said second protective plate such that said first protective plate is located on the outside surface of said trunk lid and said second protective plate is located against the inside surface of said trunk lid with said cylinder of said lock of said trunk lid extending beyond said second protective plate into said trunk, said resilient washer being sandwiched between said outside surface of said trunk lid and said first protective plate, said first and second nuts being threaded onto said first and second threaded studs of said first protective plate.

4,041,742

APPARATUS AND METHOD FOR COLD WORKING METAL POWDER

Walter J. Rozmus, Birmingham, Mich., assignor to Kelsey-Hayes Company, Romulus, Mich.

Filed Jan. 15, 1976, Ser. No. 649,540
Int. Cl.² B21B 9/00
U.S. Cl. 72—38 **29 Claims**



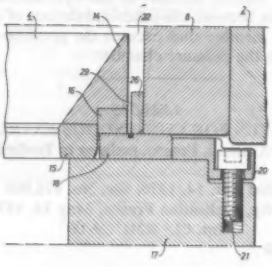
1. Cold rolling apparatus for powder metal comprising: an enclosed work chamber, a pair of rolls mounted for rotation within said chamber, drive means for rotatably driving said rolls, metering means for permitting the passage of metal powder between said rolls at a predetermined rate, supply means for supplying metal powder in bulk to said metering means, means for introducing an inert gas into said chamber, circulating and filter means for drawing said inert gas from said chamber, filtering said inert gas to remove solid contaminants, and returning filtered inert gas to said chamber, lubricating means for applying a lubricant to said metal powder prior to its passage through said rolls to reduce bonding of the powder particles to the rolls and to each other, and receiving means for receiving said metal powder subsequent to its passage through said rolls.

4,041,743

HIGH PRESSURE PRESS

Hans Gunnar Larsson, Vasteras, Sweden, assignor to ASEA Aktiebolag, Vasteras, Sweden

Filed Nov. 20, 1975, Ser. No. 633,843
Claims priority, application Sweden, Dec. 6, 1974, 7415294
Int. Cl.² B21D 72/10
U.S. Cl. 72—60 **6 Claims**



1. Press for hydrostatic extrusion comprising a press chamber adapted for enclosing a pressure medium said press chamber being formed of a high pressure cylinder with an inner liner, a piston movable into the cylinder at one end for effecting pressurization of an enclosed pressure medium, a die and a die support at the other end of the cylinder, and sealing means for preventing the pressure medium from escaping between the cylinder and the piston and die and die support at the ends thereof, in which there is a gap between the liner and the die, and in which the die support comprises an exchangeable support ring which engages the end surface of the liner of the high pressure cylinder and bridges the gap between the liner and the die and constitutes a support for the die against which one end surface of the die seals.

4,041,744

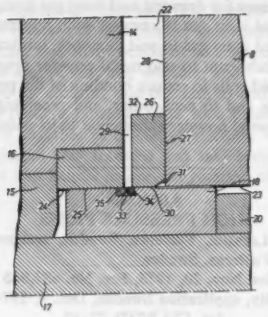
HIGH PRESSURE PRESS

Hans Gunnar Larsson, Vasteras, Sweden, assignor to ASEA Aktiebolag, Vasteras, Sweden

Filed Nov. 20, 1975, Ser. No. 633,842
Claims priority, application Sweden, Dec. 6, 1974, 7415295
Int. Cl.² B21D 72/10
U.S. Cl. 72—60 **2 Claims**

1. Press for hydrostatic extrusion comprising a pressure chamber adapted for enclosing a pressure medium, said pressure chamber including from a high pressure cylinder, a piston movable into the cylinder at one end for effecting a pressurization of an enclosed pressure medium, a die and a die support at the other end of the cylinder, and sealing means for preventing the pressure medium from escaping between the cylinder and the piston and the die and die support at the ends thereof, in which there is a metallic sealing ring in the high pressure cylinder having an outer cylindrical surface in contact with the inner wall of the cylinder by the pressure medium and an outer

end surface engaging a support member, the outer end surface of the sealing ring having a recessed portion forming together with the supporting member or together with the supporting member and the cylinder an annular space, said space commu-



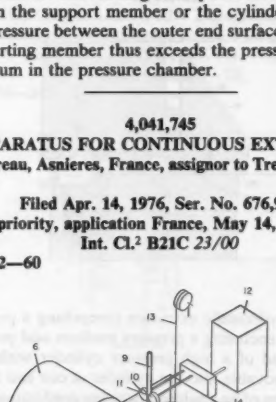
nicating with the surrounding atmosphere through a groove or channel in the support member or the cylinder, whereby the contact pressure between the outer end surface of the ring and the supporting member thus exceeds the pressure of the pressure medium in the pressure chamber.

4,041,745

APPARATUS FOR CONTINUOUS EXTRUSION

Marc Moreau, Asnieres, France, assignor to Trefimetaux, Paris, France

Filed Apr. 14, 1976, Ser. No. 676,908
Claims priority, application France, May 14, 1975, 75.15733
Int. Cl.² B21C *23/00*
U.S. Cl. 72—60 **8 Claims**



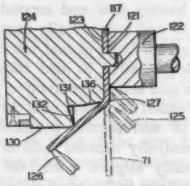
1. Apparatus for continuous extrusion of a first elongated object of indefinite length into a second object of the same type but of smaller cross section comprising, a unit defined by two co-axial members, one of said members being a rotor, and being driven by a motor and said other member being a stator, said members defining a four-sided passage between them, a groove formed in the surface of said rotor to define three sides of said passage, the opposed surface of the stator defining the fourth side of the passage, stop means carried by the stator to close the passage and an outlet die port in said stator near said stop means, an inlet port in said stator located at a position removed from said stop means and a die port, roller means including a pair of spaced rollers for forming a pair of substantially plane and parallel flats on said object to be extruded before it enters said inlet port, the said passage having two opposed sides which are substantially plane and parallel surfaces, the distance between them exceeding the distance between the rollers forming the said flats on the object by twice a quantity ranging from 0.001 to 0.1 mm, the depth of the passage, in a direction parallel to its lateral surfaces, exceeding the dimensions of the object to be extruded in that direction by at least three times the distance between a flat on the object to be extruded and the cooperating side of the groove, means for storing a supply of viscous fluid and means for feeding said fluid into the passage around the object to be extruded.

4,041,746

METHOD OF MAKING V-GROOVED SHEET METAL PULLEYS

Derald H. Kraft, Canton, Ohio, assignor to Aspro, Inc., Canton, Ohio

Division of Ser. No. 593,653, July 7, 1975, Pat. No. 3,995,474.
This application Aug. 16, 1976, Ser. No. 714,488
The portion of the term of this patent subsequent to Nov. 16, 1993, has been disclaimed.
Int. Cl.² B21D *22/14, 29/02*
U.S. Cl. 72—83 **10 Claims**



1. In a method of making a dynamically balanced cup-shaped sheet metal pulley blank of the type having a bottom hub flange wall and a connected outer cylindrical side wall terminating in an open end, from a flat sheet metal disc with pressure roll forming means, for use as a stage blank for forming a V- grooved pulley, including the steps of:

a. providing a flat uniform thickness sheet metal disc having a central hole formed therein:

b. clamping a central portion of the disc around the hole between opposed relatively axially movable complementary clamping faces of rotatable headstock and tailstock die means wherein the headstock die means also has cylindrical flange-forming means, reentrant conical flange forming means connected with the cylindrical flange forming means by a reentrant corner acutely angled in cross section, and axially extending hub forming means connecting the clamping face of the headstock die means with the reentrant conical flange forming means;

c. rotating the die means and clamped disc;

d. reforming the disc into a cup-shaped blank having a flat hub flange bottom wall, an annular reversely angled conical flange portion terminating in an axially extending open-ended cylindrical side wall portion and an axially extending annular hub wall portion connecting the bottom hub flange wall with the conical flange portion by pressure rolling, forming and ironing the rotating annular disc metal portions surrounding said central portion against the headstock die means axially extending hub forming means, the cylindrical and conical flange forming means and the connected reentrant corner;

e. said reforming step including forming a reentrant corner, acutely angled in cross section, connecting said reversely angled conical flange and said axially extending side wall portion;

f. maintaining the thickness of the disc metal throughout the hub flange bottom wall substantially unchanged from that of the sheet metal disc;

g. thinning and elongating the disc metal during the reforming step throughout the conical flange portion, the reentrant corner, the cylindrical side wall portion and the axially extending hub wall portion; and

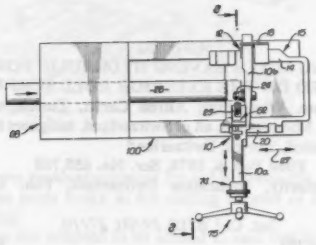
h. then while continuing rotation of the die means and clamped blank, trimming the open end of the cylindrical side wall to predetermined axial length with respect to the acutely angled reentrant corner.

4,041,747

PIPE GROOVING APPARATUS

Robert D. Elkin, Claremont, Calif., assignor to Collins Machinery Corporation, Monterey Park, Calif.

Filed Aug. 5, 1976, Ser. No. 711,800
Int. Cl.² B21D *17/04*
U.S. Cl. 72—105 **10 Claims**



1. In apparatus for grooving pipe extending longitudinally axially, the combination comprising

a. a tranversely elongated frame adapted to be displaced transversely relative to the pipe axis,

b. a grooving roller having an annular boss to swage the groove in the pipe, and a back-up roller having an annular recess in transverse alignment with said boss, said rollers carried by the frame,

c. and means to bodily and progressively displace one of the rollers relatively toward the other roller to cause the boss to progressively form the groove in the pipe wall being rotated between the rollers, the two rollers being rotated in response to pipe rotation,

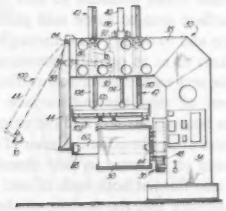
d. there being carriage structure carrying the frame for bodily transverse displacement to displace both rollers into position to receive the pipe wall therebetween, said structure floatably carrying the frame for said displacement, whereby the two rollers and frame may be bodily displaced transversely in response to groove formation.

4,041,748

METHOD AND APPARATUS FOR FABRICATING METAL CONTAINER

Eugene O. Wittke, 1609 - 29th St. SE., Medicine Hat, Alberta, Canada (T1A 2H8)

Filed July 28, 1976, Ser. No. 709,408
Claims priority, application Canada, May 3, 1976, 251671
Int. Cl.² B21D *5/08*
U.S. Cl. 72—166 **6 Claims**



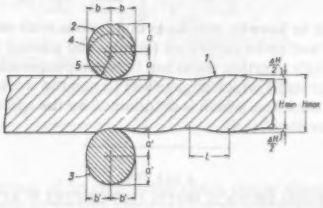
1. Apparatus for fabricating rectangular containers from a single steel sheet comprising a frame; a rectangular mandrel projecting from said frame and mounted for rotation about a horizontal axis; motor means for rotating said mandrel; a cantilever arm projecting outwardly of the frame and substantially parallel with above said mandrel horizontal axis; an end of gate on the end of said arm and depending therefrom, pivot means on the end of said gate remote from said arm for rotatably supporting one end of the mandrel; and vertically oriented hydraulic ram means mounted in said cantilever arm and having a tandem pressure roller assembly pivotally connected to the lower end of the piston rod thereof, said rollers being parllel with and directly above said mandrel rotational axis; said ram applying pressure through said tandem rollers against a steel sheet grasped between said rollers and the mandrel and rotated thereby, to form said rectangular container.

4,041,749

METHOD OF PRODUCING SHEET OR PLATE FROM ROLLING STOCK

Giswalt Veitl, Linz, Austria, assignor to Vereinigte Osterreichische Eisen- und Stahlwere-Alpine Montan Aktiengesellschaft, Linz, Austria

Filed Nov. 15, 1976, Ser. No. 741,760
Claims priority, application Austria, Nov. 24, 1975, 8907/75
Int. Cl.² B21B *1/02*
U.S. Cl. 72—187 **9 Claims**



1. In a method of producing sheet or plate from rolling stock in particular heavy plate having a thickness in excess of 100 mm, by hot rolling slabs, in particular continuously cast slabs, in a number of passes, wherein at least in one pass, the rolling stock is alternately deformed more strongly and less strongly between a pair of rolls, the improvement which comprises, when the rolling stock is less strongly deformed, observing the condition: α' equal to or smaller than ρ, and, when the rolling stock is more strongly deformed, observing the condition: ρ smaller than α smaller than 2ρ, α and α' representing the angles of engagement and ρ representing the angle of friction, and levelling out differences in thickness in longitudinal direction of the rolling stock in a subsequent pass.

4,041,750

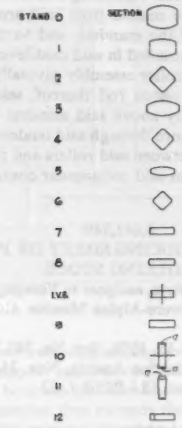
METHOD AND APPARATUS FOR PRODUCING SERRATED METAL BARS

Keith William Moore, 8 Burradool Street, West Wollongong, New South Wales, Australia

Filed Mar. 15, 1976, Ser. No. 667,167
Claims priority, application Australia, Oct. 10, 1975, 3418/75
Int. Cl.² B21B *1/12*
U.S. Cl. 72—187 **10 Claims**

1. A method of producing flat metal bars each having at least one edge serrated, comprising passing a billet workpiece of hot metal which has hot roll characteristics through a series of stands of cooperating rolls in a hot roll mill, so as to elongate the billet into a bar and form the bar to a generally rectangular shape, passing the workpiece through a groove in a roll in a notching stand at a high speed, said groove having a root wall, and side walls which diverge outwardly and curve away from one another towards the groove mouth to define between them a bell-mouth shape in cross-section, said mouth being at a locality adjacent a working zone, supporting one edge of the

work-piece remote from the working zone by said groove root, forming serrations in the other edge of the bar in the working zone while it is still in its hot and plastic state by engaging that other edge with outstanding teeth of a second co-operating roll, while at the same time deforming the workpiece within



the groove to have its side faces contiguous with said groove side walls and to be supported thereby and passing the workpiece through a further stand and between cooperating rolls of that further stand which engage and flatten the workpiece side faces to a thickness which is determined by the space between said further stand rolls.

4,041,751

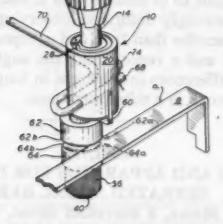
BURRING DEVICE WITH OPPOSITELY ACTING DEBURRING ELEMENTS

Hildaur L. Neilsen, 2 Juniper St., Metuchen, N.J. 08840

Filed Sept. 15, 1976, Ser. No. 723,489

Int. Cl.² B21J *7/32*

U.S. Cl. 72—199 **8 Claims**



1. A deburring device for smoothing edges of sheet material, comprising intermittently acting hammer means, operating means for operating said hammer means rapidly to impart a vibratory action to said hammer means, a housing supported on and deriving vibrations from said hammer means, an extension stem rigidly integral with said housing, extending in parallelism with the direction of vibratory movement of said hammer means, an impact member loosely connected to said housing and coacting with said hammer means to be vibratorily actuated thereby, a first peening collar carried slidably and freely rotatably on said stem in position for engagement by said impact member to derive vibratory movement therefrom, a second peening collar carried slidably and freely rotatably on said stem adjacent to and in coacting relationship to said first peening collar, and adjustment means on said stem for controlling the coacting relationship of the two said collars; adjacent annular surfaces of said collars defining therebetween an annular recess for receiving a sheet material edge to be deburred, and one of said annular surfaces including a reversely curved annular surface adapted to roll and hammer upon a side edge portion of said sheet material to be deburred.

4,041,752

ROLLING MILLS HAVING HYDRAULIC FORCES EXERTED ON THE EXTERIOR ROLL SURFACES

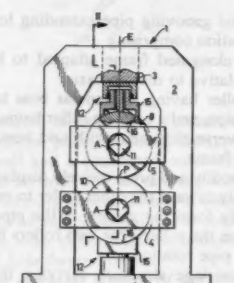
Anton Dolenc, Winterthur; Alfred Christ, Zurich, and Rolf Lehmann, Mutschellen, all of Switzerland, assignors to Escher Wyss Limited, Zurich, Switzerland

Filed Feb. 6, 1976, Ser. No. 655,768

Claims priority, application Switzerland, Feb. 13, 1975, 1764/75

Int. Cl.² B21B *29/00, 27/10*

U.S. Cl. 72—201 **14 Claims**



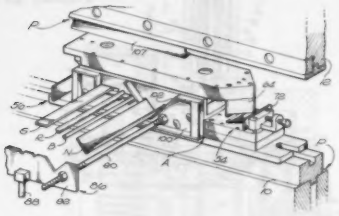
1. In a rolling mill having a frame and a plurality of rolls mounted thereon, means for exerting pressure on the exterior surface of at least one of said rolls which comprises at least one hydrostatic pressure device including a cylinder fixed with respect to said frame, a piston movable in said cylinder and defining a chamber therebetween, said piston having at one end a first surface area within said chamber and at the opposite end, a bearing surface facing said exterior surface of said roll, a plurality of hydrostatic pressure pockets formed in said bearing surface and a plurality of throttling ducts connecting said pockets individually with said chamber, and means for continuously applying fluid under pressure to said chamber and to said first piston surface area to force said piston toward said exterior roll surface and to supply fluid through said throttling ducts to said pockets so as to provide pressure fluid between said bearing surface and said exterior roll surface, the effective cross-sectional area of said bearing surface for producing forces between the bearing surface and the exterior surfaces of the roll being greater than the effective area of said first piston surface area exposed to pressure in said chamber so that the forces exerted by said fluid at both ends of said piston are such that said bearing surface and the surface of the roll are maintained in spaced apart relation during operation to permit a continuous fluid flow therebetween thereby avoiding direct contact between said piston and said roll and removing from said roll heat generated during said rolling operation.

4,041,753

PRESS BRAKE ATTACHMENT FOR FORMING AND CUTTING METAL

Alfred G. O. Hix, 3230 Rancho La Carlotta Road, Covina, Calif. 91722

Filed July 26, 1976, Ser. No. 708,778
Int. Cl.[2] B21D *37/08*
U.S. Cl. 72—332 3 Claims



1. A press brake attachment for use between the ram and the bed of the press brake as for cutting lengths of linear stock, comprising:

a striker bar adapted to be affixed to said ram to provide an impact surface;

a bed member adapted to be affixed to said bed and including a rigidly-supported shear plate defining at least one recess to supportably receive a length of linear stock, and a yield block yieldably aligned with said rigidly-supported shear plate and similarly defining at least one recess to supportably receive a length of linear stock;

a force member aligned above said bed member and spring biased away from said bed member, said force member including a movable shear plate defining at least one extension complementary to said one recess in said rigidly-supported shear plate, said movable shear plate being supported in a position of offset alignment with said rigidly-supported shear plate;

a pair of retainer plates to define apertures for matingly passing lengths of various linear stock and being fixed on opposed sides of said bed member, each defining at least one of at least one pair or passages aligned with said one recess in said bed member to receive a length of linear stock; and

said attachment further including a forming punch affixed to said force member and a forming die affixed to said bed member for mating engagement to bend lengths of metal.

4,041,754

PROCESS FOR PREPARING A POLE PIECE FOR THE ROTOR OF A GENERATOR

Shoichi Otani, No. 5-13, 1-chome, Nishi Ogu, Arakawa, Tokyo, Japan

Filed Aug. 17, 1976, Ser. No. 715,059
Claims priority, application Japan, Sept. 4, 1975, 50-107808
Int. Cl.[2] B21D *22/00*
U.S. Cl. 72—356 1 Claim

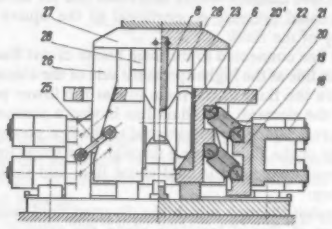
1. A process for preparing a pole piece for the rotor of a generator comprising the steps of cutting a slug having a predetermined volume of from a round metal bar of an indefinite length, of upsetting said slug to a disc-shaped member, of forming said member to provide a plurality of spiders extending radially and outwardly from the periphery of said member and a center boss on one major surface of the member, of forming said member to taper the opposite sides and one surface of said spiders, of bending of said spiders toward said boss until the nontapered surface of said spiders lie on a plane right angles to the plane of said member, of coining said member to remove any irregularity present on the member and of sizing said member to provide a complete pole piece for the rotor of a generator.

4,041,755

METHOD AND DEVICES FOR FORGING SINGLE CRANK THROWS OF SEMI-BUILT UP CRANKSHAFTS

Tadeusz Rut, Poznan, Poland, assignor to Instytut Obrobki Plastycznej, Poznan, Poland

Filed Feb. 26, 1976, Ser. No. 661,518
Claims priority, application Poland, Mar. 15, 1975, 178817
Int. Cl.[2] B21K *1/08*
U.S. Cl. 72—353 7 Claims



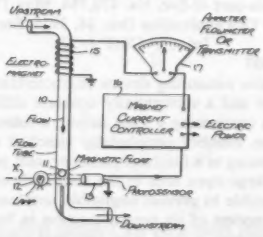
1. A method of forging single crank throw elements comprising upsetting a rough piece to form a blank having opposite shoulder portions with a narrowing connection portion, the connection portion narrowing from both shoulder portions to a central narrowest section, placing said blank in a die with said shoulder portions resting on inclined surfaces of the die such that clear spaces are formed between the shoulder portions and the inclined surfaces, applying a force against the narrowing connection portion in a direction perpendicular thereto to deform said connection portion in a direction to fill said clear spaces and concurrently applying upsetting forces on said shoulder portions in a direction perpendicular to the direction of the force applied to said connecting portion.

4,041,756

FORCE-TYPE FLOWMETER

Victor P. Head, Hatboro, and Peter J. Herzl, Morrisville, both of Pa., assignors to Fischer & Porter Co., Warminster, Pa.

Filed Oct. 29, 1975, Ser. No. 626,832
Int. Cl.[2] G01F *1/28, 1/56*
U.S. Cl. 73—194 E 3 Claims

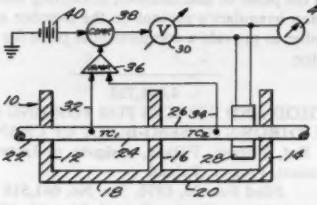


3. A flowmeter as set forth in claim 1, wherein said means to indicate is an ammeter in series with said electromagnet.

4,041,757
FLUID FLOWMETER

William C. Baker, Hampton, and John J. Chapman, Virginia Beach, both of Va., assignors to Teledyne, Inc., Los Angeles, Calif.

Filed Dec. 30, 1975, Ser. No. 645,454
Int. Cl.[2] G01F 1/68, 5/00
U.S. Cl. 73—202 8 Claims



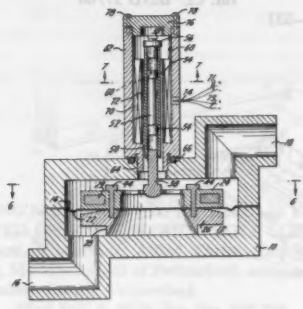
1. Apparatus for measuring fluid flow through a main supply line, comprising:
   a. a restrictive element within said main line for developing a differential pressure proportional to the square of the velocity of the fluid;
   b. a shunt line connected to the main line to divert fluid from the main line at the higher pressure side of the element and to return the fluid to the main line at the lower pressure side of the element, said shunt line having a pressure drop thereacross which is proportional to the first power of the velocity of the fluid passing through said shunt line;
   c. a thermal connected in said shunt line, said flow meter including:
      1. a conduit through which the diverted fluid passes;
      2. means at spaced locations along the exterior of said conduit for sensing the temperature of the conduit at said locations and for producing output signals representative of the temperatures sensed;
      3. means for heating a first portion of said conduit containing a first one of said temperature sensing means;
      4. means for preventing a second portion of said conduit from being heated when said first portion is heated, said second conduit portion containing a second one of said temperature sensing means;
      5. means responsive to the output signals produced by the temperature sensing means for varying voltage supplied to said heating means in order to maintain a constant difference in temperature between said first and second temperature sensing means; and
      6. indicating means responsive to the first power of the voltage supplied to said heating means to thereby provide a representation which is a function of the flow rate through said main supply line.

4,041,758
LINEAR RESPONSE FLOW METER

Nyyrikki K. Stenberg, Roslyn, Pa., assignor to Dart Industries, Inc., Los Angeles, Calif.

Continuation-in-part of Ser. No. 470,784, May 17, 1974, Pat. No. 3,964,310. This application Dec. 24, 1975, Ser. No. 644,016
Int. Cl.[2] G01F 1/22
U.S. Cl. 73—207 16 Claims

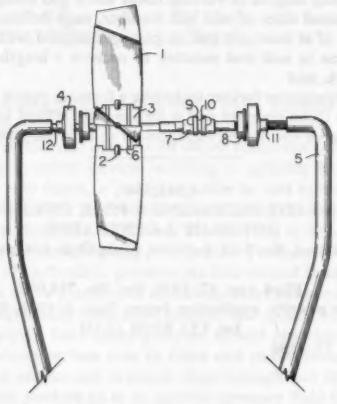
1. A fluid flow measuring device characterized by a highly linear response and a substantially constant differential pressure operation comprising a main casing; a substantially horizontal partition member peripherally attached to the lateral walls of said casing in a fluid tight manner, said partition member having a large open area in the middle thereof and being sufficiently flexible to present negligible resistance to measurable vertical motion of its central portion in both directions from the horizontal; a fluid inlet into said casing below the level of said peripheral attachment of said partition member and a fluid outlet from said casing above said level; a rigid, symmetrically shaped fluid flow control element symmetrically mounted on the central portion of said partition member; rigidly mounted on said casing in uniform directly opposed alignment beneath said element a cooperatively designed fluid flow control element positioned so that it is substantially below the upper control element when said partition member is horizontal but within full contact reach of same upon deflection of the central portion of said partition as permitted by its said negligible resistance motion capability; and means for measuring said vertical motion upwards from the point of contact between the respective fluid flow control elements.



4,041,759
ENVIRONMENTALLY-RESISTANT ANEMOMETER

Thomas Y. Palmer, Fallbrook, and Clifford J. Auvil, Loma Linda, both of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Apr. 27, 1976, Ser. No. 680,650
Int. Cl.[2] G01F 1/10
U.S. Cl. 73—231 R 3 Claims

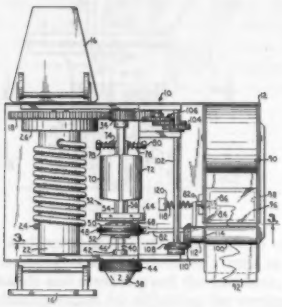


1. A cosine anemometer for measuring fluid velocity, which anemometer is composed of a plurality of helicoidal blades attached to a hub, the lower, notched end of said blades together with a plurality of parallel ridges around the circumference of said hub form a channel for deflecting air along said blades for the purpose of eliminating blade-created vortex interference with other blades, said hub rotatably mounted on a suitably supported shaft, which shaft and said hub contain devices to sense the rotational speed of said hub, which sensing devices are connected to appropriate recordation devices.

4,041,760
EXERCISE APPARATUS

Glen E. Henson, and Milton W. Fisher, both of Independence, Mo., assignors to Robar Mini-Gym, Inc., Independence, Mo.

Continuation of Ser. No. 375,938, July 2, 1973, Pat. No. 3,896,672. This application Mar. 14, 1975, Ser. No. 558,227
The portion of the term of this patent subsequent to July 29, 1992, has been disclaimed.
Int. Cl.[2] G01L 5/02
U.S. Cl. 73—379 20 Claims



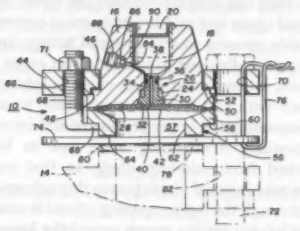
1. Exercise apparatus comprising:
a rotatable shaft;
a first member having first and second frictional surfaces, said member being journaled on the shaft;
means for holding said first member against rotation with the shaft;
a second member coupled with the shaft and movable toward and away from said first surface for engagement with the latter upon rotation of the shaft;
a third member rotatably coupled with the shaft on the side of said first member opposite said second member and movable longitudinally of the shaft into engagement with said second surface whereby to sandwich said first member between the second and third members;
means for moving said third member a predetermined distance longitudinally of the shaft in the direction of said first member and for holding said third member in a predetermined longitudinal position whereby said third member grips said first member with a predetermined force;
means adapted to be acted upon by a user of the apparatus for rotating said shaft; and
centrifugal force responsive structure rotatably coupled with said shaft and responsive to the speed of rotation of the shaft for first moving said second member in the direction of said first member to engage the second member against the first member with greater force as the speed of rotation continues to increase, and for withdrawing the second member from the first member as the speed of rotation decreases.

4,041,761
PREPACKAGED GUARD DEVICE SUB-ASSEMBLY FOR PRESSURE RESPONSIVE INSTRUMENTS

Jack Conti, Norwalk, Conn., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed June 7, 1976, Ser. No. 693,614
Int. Cl.[2] G01L 7/08
U.S. Cl. 73—420 2 Claims

1. A subcombination flange type guard apparatus for a pressure sensitive instrument comprising in combination:
a. a housing defining a central passage extending between an inlet for receiving a pressure change communicated from a connected fluid source and outlet for communicating with a pressure sensitive instrument;
b. a diaphragm supported contiguously subtending said housing adapted to be exposed at its underside to a connected fluid source for transmitting pressure changes of the fluid source through said housing passage;
c. a passage defining annular sleeve of non-metallic composition positioned with one end contiguous to said diaphragm oppositely of said housing, said sleeve defining a gasket sealing surface at its free end surrounding its passage and a radially extending annular shoulder at an intermediate location peripherally between its ends;
d. securement means securing said housing, diaphragm unit and sleeve as a prepackaged sub-assembly in their operative relation to each other, said securement means including an annular mounting flange encircling said housing and L-shaped threaded fasteners mounted angularly dis-

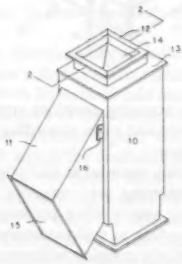


placed in said flange and each having a foot by which to grip the underside of said shoulder in securing said diaphragm in sandwiched relation between said sleeve and said housing;
e. installation means provided for enabling said sub-assembly to be installed into sealed relation with a pressure source while maintaining the operative relation effected by said securement means, said installation means comprising a plurality of bolt apertures defined in said mounting flange displaced from said fasteners for receiving bolts capable of securing the sealing face of said sleeve into sealing relation with a received gasket and matchup sleeve at the pressure source; and
f. a metallic liner positioned intervening between the foot of said fasteners and the underside of said sleeve shoulder.

4,041,762
SWING CHUTE SAMPLER

George S. Shurtleff, Coon Rapids, Minn., assignor to Baker Oil Tools, Inc., Los Angeles, Calif.

Filed Oct. 15, 1975, Ser. No. 622,660
Int. Cl.[2] G01N 1/04
U.S. Cl. 73—422 R 10 Claims



1. A swing chute sampler for particulate material comprising:
a. an external housing having upper and lower openings and a side-arm chute communicating with an opening in the side of said housing.

b. a fixed internal chute disposed at least partially within the upper portion of said housing and having an upper opening and a lower opening, the upper opening of said internal chute sized to communicate with a feed chute and sealed within the upper opening of the housing, said fixed chute extending below the upper edge of the side arm opening of the housing,

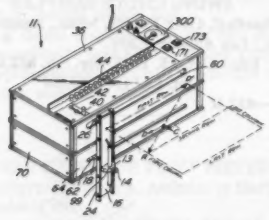
c. a swing chute having an upper opening and a lower opening and a cross-section of the same general shape as said internal chute, said swing chute having hinge means to pivot said chute at the upper edge of its forward wall near the junction of the upper edge of the side opening in the housing, said swing chute dimensioned to pivot about its attachment to the housing to move from a first position wherein the upper opening of said swing chute communicates with and slightly overlaps the lower opening of said internal chute and said lower opening communicates with said side opening so that material falling down said internal chute is diverted to said side arm chute and a second position wherein said swing chute is substantially axially aligned with said fixed internal chute, its upper opening encompassing the lower portion of said internal chute and substantially overlapping same and its lower opening removed from said-arm chute so that material falling down said internal chute passes through said swing chute and through the lower opening of said housing, said swing chute having sealing means to seal the lower edge of said side opening when said swing chute is in said second position.

4,041,763

METHOD AND APPARATUS FOR AUTOMATICALLY SAMPLING MATERIAL IN PRE-PROGRAMMED POSITIONS

Frederick Pfleger, F. P. Developments, Inc., 27 Cherry Ave., Maple Shade, N.J. 08052

Filed Feb. 10, 1976, Ser. No. 657,017
Int. Cl.[2] G01N *1/10*
U.S. Cl. 73—423 A **23 Claims**



1. Apparatus for scanning positions arranged in a rectangular array of columns and rows according to a predetermined program, comprising:

means for sampling material at said positions;

means for transporting said sampling means in the same direction along one or more predetermined rows of said positions according to said predetermined program;

means for selectively stopping said sampling means at one or more preselected positions in said predetermined rows according to said predetermined program; and

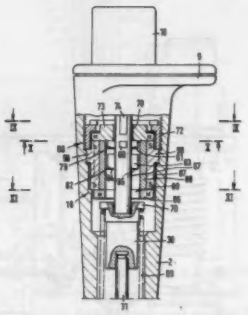
means responsive to said selectively stopping means for causing said sampling means to sample said material at each of said preselected positions according to said predetermined program.

4,041,764

PIPETTE DEVICE

Horst Sabloewski; Klaus Schürbrock, and Dieter Solter, all of Hamburg, Germany, assignors to Eppendorf Geratebau Netheler & Hinz GmbH, Hamburg, Germany

Filed Oct. 14, 1976, Ser. No. 732,212
Claims priority, application Germany, Nov. 5, 1975, 2549477
Int. Cl.[2] B01L *3/02*
U.S. Cl. 73—425.6 **11 Claims**



1. In a pipette device including an elongate casing, an actuating member projecting from an upper end of said casing, spring means disposed within an internal cavity of said casing between inner casing support means and said actuating member for urging said actuating member into an outwardly projecting position, abutment means within said casing cavity between said actuating member and an inner casing wall portion for restricting movements of the actuating member outwardly from said casing, a cylinder disposed within said casing cavity, a piston slidably mounted within said cylinder and coupled to said actuating member, the piston adapted to displace an air volume, a connector extension on said casing serving as connecting means for slip-on pipette tip members open at their upper and lower ends, said connector extension having an inner through bore in communication with said cylinder, whereby said actuating member is adapted to be moved inwardly into said casing for displacing an air volume in a blow-out direction, and said actuating means is adapted to be displaced further in the same direction for performing an excess lift movement to expel a fluid volume that has previously been drawn in by movement of the actuating means in the opposite direction, the fluid volume corresponding to the air volume displaced, and to optionally move an ejector device in the axial direction of the casing, the ejector device comprising a push member slidably movable within said casing and adapted to engage the upper end edge of a mounted slip-on pipette tip member, one of the means consisting of piston, piston rod and actuating member including stop means effective as an abutment during the lifting movement of the actuating member, the improvement wherein said abutment means (**24, 25, 86**) is coupled to releasable detent means (**18**) including two members, one of said two members defining the abutment (**25**), and the other of said two members (**26**) being secured within said casing whereby said releasable detent means (**18**) is adapted to be released by application of a temporarily increased actuating pressure to said actuating member (**10**).

4,041,765

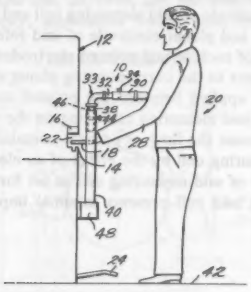
PRESS BRAKE GUARD

Morton L. Kemper, P.O. Box 6, Littlestown, Pa. 17340

Filed Aug. 26, 1976, Ser. No. 718,204
Int. Cl.[2] B21D *55/00*
U.S. Cl. 72—389 **4 Claims**

1. In combination with a pressing machine having a vertically movable ram which cooperates with a bed or the like to

shape a work piece manually inserted between the ram and the bed by an operator, a safety guard for preventing entry of the operator's hands between the ram and the bed comprising a horizontal bar which is generally coextensive with the horizontal dimension of the ram and bed and a support assembly for said bar for supporting said bar in a position spaced from



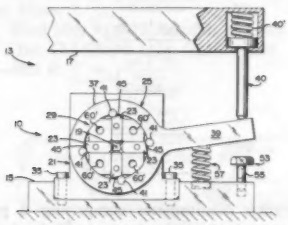
the machine and between the machine and an operator such that the bar is engaged by the operator's arms as the operator extends his hands and arms toward the machine, said support assembly including means for adjusting the vertical position of the bar relative to the machine and means for adjusting the horizontal position of the bar in a direction transverse to the length of the bar.

4,041,766

SWAGING DEVICE FOR USE WITHIN A DIE APPARATUS

Robert Richard Johnson, Ludlow; Robert Arthur Coons, Pittsfield, and John Andrew Zwald, York, all of Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed June 3, 1976, Ser. No. 692,445
Int. Cl.² B21J 9/06
U.S. Cl. 72—402 **9 Claims**



1. In a die apparatus including a stationary lower base member and a movable upper shoe member and incorporating a swaging device therein operating in conjunction with said die apparatus for swaging a wire intermittently passing through said die apparatus, the improvement wherein said swaging device comprises:

a housing secured to said stationary lower base member of said die apparatus, said housing having a first opening therein for permitting said wire to pass therethrough and having an annular portion projecting therefrom in alignment with said first opening, said annular portion having a plurality of spacedly and radially positioned channels therein, said channels at their inner ends meeting to form a second opening aligned with the first opening and in communication therewith,

a swaging member slidably carried in each of the aforesaid channels, the inner end of each swaging member being configured to cooperate with that of the other swaging members to produce the desired swaging action, the outer end of each swaging member having a cam surface shaped to provide the desired travel of the swaging member in its channel,

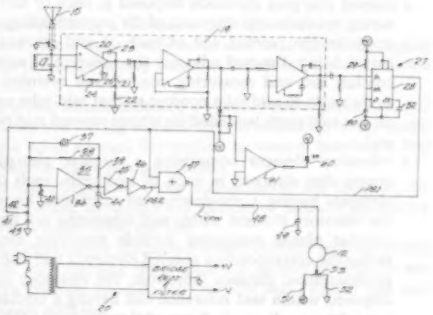
an actuator comprising a substantially annular body having its inner circular surface fitting over the outer surface of the annular portion projecting from the housing for rotation thereabout, a plurality of cylindrical pins carried by the annular body and positioned for alignment with the swaging members, a portion of the outer cylindrical surface of each pin extending beyond the inner surface of the annular body to engage the cam surface of its respective swaging member, and an arm extending from the annular body and operatively connected to the movable upper shoe member of said die apparatus, whereby upon downward movement of the upper shoe member the actuator arm is moved so as to cause the actuator body to rotate about the annular portion projecting from the housing thereby causing the pins to move over their respective cam surfaces to drive the swaging member inwardly to deform the wire.

4,041,767

TESTING APPARATUS FOR USE IN CALIBRATING WRISTWATCHES

Eugene R. Keeler, 11093 Petal Ave., Fountain Valley, Calif. 92708, and Michael R. Harrison, 7691 - 13th St., Westminster, Calif. 92683

Filed Oct. 18, 1976, Ser. No. 733,381
Int. Cl.² G04D 7/12
U.S. Cl. 73—6 **6 Claims**



1. Apparatus for testing the timing accuracy of a wristwatch whose timing accuracy depends on the oscillation frequency of an electrical oscillator in the wristwatch, the apparatus comprising:

means for deriving electrical energy radiated from the wristwatch to produce a first periodic signal, the fundamental frequency of which depends on said oscillation frequency;

circuit means responsive to the first periodic signal for producing a second periodic signal, the fundamental frequency of which equals the fundamental frequency of the first periodic signal, the circuit means including frequency-dependent phase-shifting means for causing a phase shift to be defined between the first and second periodic signals with the amount of the phase shift being dependent on the frequency difference between the equal fundamental frequencies and a predetermined standard frequency;

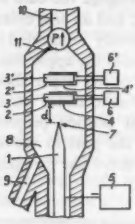
an indicator; and

phase difference detecting means responsive to the first and second periodic signals for producing an indicator control signal to cause the indicator to display an indication of said frequency difference.

4,041,768
DEVICE FOR MEASURING THE MASS OF PARTICLES OF AN AEROSOL PER VOLUME UNIT

Alain Gibert, Gan, and Roger Camps, Jurancon, both of France, assignors to Societe Nationale des Petroles d'Aquitaine, Courbevoie, France

Filed Jan. 7, 1976, Ser. No. 647,066
Claims priority, application France, Jan. 15, 1975, 75.01128
Int. Cl.[2] G01N *15/06*; B03C *3/00*
U.S. Cl. 73—28 3 Claims



1. A device for measuring the mass of particles contained in an aerosl per volume unit thereof, comprising:

a block of electrical insulating material having a measuring cell and a reference cell defined therein;

each said cell comprising a measuring conduit, an inlet conduit communicating with said measuring conduit for introducing a flow of air loaded with particles into said measuring conduit, and an outlet conduit communicating with said measuring conduit at one end and with the atmosphere at the other end;

a pointed charging electrode disposed in each of said measuring conduits opposite each of the corresponding outlet conduits, the pointed end of each of said pointed electrodes being disposed adjacent the junction of said inlet conduit and said measuring conduit and oriented at an acute angle to said inlet conduit so that said inlet conduit directs said particle-loaded air stream toward said pointed end;

a vibratory element comprising a circular piezoelectric quartz disc disposed in each of said cells, each of said elements having a pre-determined resonance frequency, the vibratory element within said measuring cell having a circular planar measuring particle receiving electrode facing the corresponding pointed electrode and disposed a predetermined distance therefrom, the vibratory element disposed within said reference cell having a circular planar reference electrode disposed thereon facing the corresponding pointed electrode and disposed a predetermined distance therefrom, the plane of each of said electrodes being substantially normal to the direction of orientation of the corresponding pointed electrode, the distance between each pointed electrode and the corresponding planar electrode being greater than that required to generate a spark therebetween when a predetermined high voltage is applied between each of said pointed an a planar electrodes;

means for maintaining the current flowing between the electrodes of said measuring cell at a desired value;

each of said vibratory elements being disposed within the corresponding cell in such a manner that air may flow around all sides thereof between said inlet and outlet conduits;

means for suspending each of said vibratory elements within the corresponding cell thereof in such a manner that the resonance frequency of each element varies with its mass;

means for measuring the resonance frequency of each of said vibratory elements and generating an output signal corresponding to the difference therebetween;

the arrangement of each of said cells and the corresponding conduits being such that the surface of each vibratory member opposite the corresponding planar electrode faces the corresponding outlet conduit, and the distance between the point of each pointed electrode and the nearest point on the surface of the corresponding planar electrode is on the order of 15 mm.; and

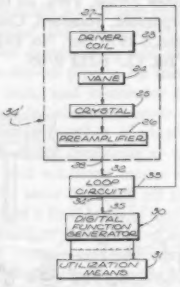
means for establishing and maintaining a high voltage DC potential difference between (i) the pointed electrode and planar electrode of said measuring cell and (ii) the pointed electrode and planar electrode of said reference cell, the potential of each of said pointed electrodes being positive with respect to the corresponding planar electrode;

the voltage applied between the pointed and planar electrodes of said measuring cell being on the order of 10,000 volts to cause the flow of particle-containing air through said measuring cell by the effect of an electric wind, the geometry of said measuring cell as set forth above being such that said cell presents minimal impedance to said flow.

4,041,769
DENSITOMETER

Milton H. November, Hacienda Heights, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Oct. 5, 1976, Ser. No. 729,779
Int. Cl.[2] G01N *9/00*
U.S. Cl. 73—32 A 3 Claims



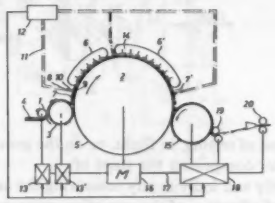
1. A vibration densitometer comprising: a probe having input and output leads; and a loop circuit having output and input leads connected respectively from and to said probe input and output leads, said probe having a magnetostrictive driver including a magnetostrictive tube, a coil mounted around said tube, said coil being connected from said probe input lead, and a permanent magnet fixed relative to one end of said tube to oppose the magnetic flux created by said coil by the flow of current therein in one direction, a vane to be vibrated by said tube, and means connected to said probe output lead responsive to vane vibrations to produce an electrical A.C. signal synchronously therewith and to impress the same on said coil, said probe and said loop circuit forming an electromechanical oscillator whose resonant frequency is a function of the density of the fluid in which said vane is immersed, said opposition to said magnetic flux allowing said flux to vary, but biasing the same in a manner such that it does not substantially reverse directions during the positive and negative swings of said A.C. signal so that the probe output lead has a signal with a frequency the same as that on the probe input lead.

4,041,770

METHOD AND APPARATUS FOR SENSING THE THICKNESS OF A FIBER LAYER ON A MOVING SURFACE

Paul Staheli, Wilen near Wil, and Robert Moser, Winterthur, both of Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Oct. 29, 1975, Ser. No. 626,753
Claims priority, application Switzerland, Sept. 30, 1975, 12637/75
Int. Cl.[2] G01B *13/06*
U.S. Cl. 73—37.5 16 Claims



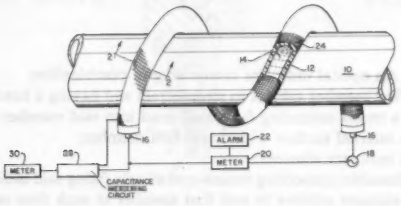
2. A fiber handling machine comprising
a moving surface for receiving and conveying an air containing fiber layer thereon;
a plate disposed a preset distance above said surface to define a chamber therebetween for passage of the fiber layer;
a duct connected to said plate in communication with at least one sensing point at a side of said plate facing the layer to transmit pneumatic signals caused by the air contained in the fiber layer and corresponding to thicknesses of the fiber layer thereat from said sensing point; and
a measuring and control means for receiving pneumatic signals from said duct to produce a control signal in response thereto.

4,041,771

TEMPERATURE-SENSITIVE DETECTOR

Donald S. Allan, Westwood, and Daniel Schiff, Framingham Center, both of Mass., assignors to Arthur D. Little, Inc., Cambridge, Mass.

Filed May 9, 1975, Ser. No. 576,083
Int. Cl.[2] G01M *3/18;* G01R *31/08*
U.S. Cl. 73—40.5 R 6 Claims



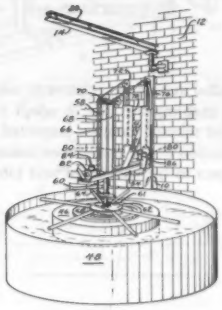
1. A leak detector for a first container adapted for holding a first body of material at temperatures which are different from ambient temperature, said detector comprising in combination:
an elongated tube of an electrically nonconductive material, said tube being adapted to be distributed along the exterior of said first container;
a second body of a second material in said tube, said second body being normally of a first electrical conductivity in a first phase at ambient temperature and capable of exhibiting at a predetermined temperature between said ambient temperature and said temperatures of said first body of material, a local change in phase and electrical conductivity between said first phase and a second phase at a location where said predetermined temperature occurs; and
means for sensing the location of said local change in phase in said elongated tube, said means for sensing comprising elongated electrically-conductive means disposed along said tube and means for measuring from one end of said tube, the electrical capacitance between said elongated electrically-conductive means and said second material.

4,041,772

APPARATUS FOR LOCATING PUNCTURES IN TIRES

Albert Taich, Chicago, and Theodore Gill, Northlake, both of Ill., assignors to Consumer Tire & Supply Co., Inc., Chicago, Ill.

Filed Aug. 27, 1976, Ser. No. 718,174
Int. Cl.[2] G01M *3/06*
U.S. Cl. 73—45.6 4 Claims



1. An apparatus for locating leaks in a tubeless tire comprising;
means for lifting a tire into a tank of water;
power means operatively connected to a spider for urging the tire downwardly beneath the level of the water in the tank;
said power means including a cylinder and a piston rod, said piston rod having one end thereof connected to the spider and being adapted for vertical movement between a first position and a second position;
a pressure regulator being connected to the cylinder for controlling accurately the amount of pressure applied by the cylinder upon the tire;
means operatively connected to said cylinder and said piston rod for returning them from the second position to the first position upon de-activation of said cylinder and said piston rod; and
said returning means including a pair of counterweights adapted for lifting the piston rod and the spider.

4,041,773

ULTRASONIC INSPECTION APPARATUS FOR WELL OPERATIONS

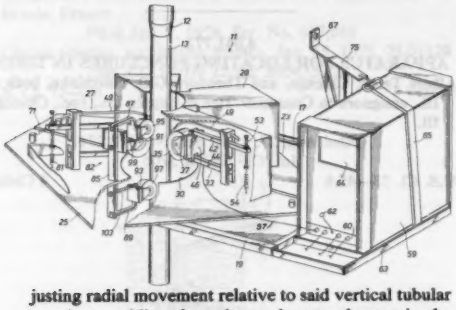
H. Morris Hauldren, Culloden, W. Va.; Jack R. Claycomb, Lafayette, La.; Deke E. DeKerlegand, Lafayette, La., and Chi-Haung Chang, Lafayette, La., assignors to W. C. Lamb, Lafayette, La.

Filed Oct. 8, 1975, Ser. No. 620,747
Int. Cl.[2] G01N *29/04*
U.S. Cl. 73—67.8 S 9 Claims

1. Apparatus for ultrasonic inspection of vertical tubular members which comprises:
a frame defining a vertical passage for said tubular member accessible from a direction transverse to the longitudinal axis of said tubular members;
a plurality of ultrasonic search units disposed on said frame, each including an electro-acoustical transducer for transmitting an ultrasonic signal into the wall of said member;
a mechanism mounted each search unit on said frame to

yieldably urge said ultrasonic search unit into contact and sonically coupled relation with the surface of the tubular member;

said mechanism providing each search unit with self-adjusting radial movement relative to said vertical tubular member, enabling the unit to adapt to changes in the size of said tubular member inspected without altering the orientation of the transducer inside said search unit with respect to the surface of said tubular member.



4,041,774

ACOUSTIC DATA ACQUISITION DEVICE

Winfred L. Morris, and Donald O. Thompson, both of Thousand Oaks, Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed July 2, 1976, Ser. No. 702,254
Int. Cl.² G01N *29/00*
U.S. Cl. 73—67.9 **29 Claims**

1. Apparatus for acquiring information on acoustic properties of structural materials, comprising:

means for receiving an acoustic signal from a part of such a material;

means for processing the signal frequency-selectively for extracting therefrom narrow banded components having different frequencies;

means for extracting digital information from said narrow banded components;

means for storing digital reference information means for digitally processing the extracted digital information with the stored reference information; and

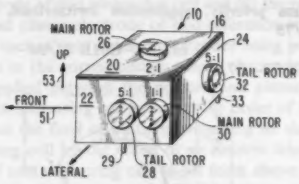
means for providing a representation of the processed information in dependence upon frequency.

4,041,775

VIBROMETER

James Arthur McNamee, Burlington, Mass., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 27, 1975, Ser. No. 562,772
Int. Cl.² G01H *1/00*
U.S. Cl. 73—70.2 **2 Claims**



2. A method of testing, in flight, or on the ground the rotors of a helicopter comprising the steps of:

concurrently and individually measuring the amplitudes and modes of vibration of the respctive rotors of the helicopter; and

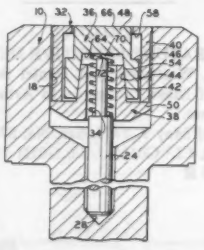
indicating, in response to the measurements, different fault vibratory conditions for each of the rotors.

4,041,776

STRAIN INDICATOR

William J. Payne, Greensburg, Pa., assignor to Modulus Corporation, Chagrin Falls, Ohio

Filed Mar. 22, 1976, Ser. No. 669,247
Int. Cl.² F16B *31/02*
U.S. Cl. 73—88 F **14 Claims**



1. An optical indicator comprising in combination:

a first member subject to stress-strain and having a head and a recess extending from said head into said member;

an internal surface within said first member;

an indicator element;

releasable connecting means operatively fixing said indicator element relative to said first member at such time as said first member has been placed under load;

said internal surface being movable relative to said indicator element as a function of the stress applied to said first member, there being at least a load position of said internal surface and a decreased load position;

said indicator element being released relative to said first member as a result of contact of said releasable connecting means and said internal surface as said internal surface moves from a load position to a decreased load position;

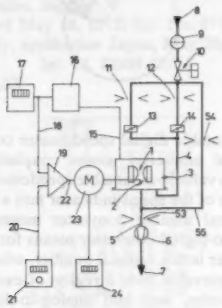
bias means to move said indicator element relative to said first member upon release of said releasable connecting means;

movement of said indicator element relative to said first member providing a visual indication of the fact that said first member has reached a condition of decreased load.

4,041,777
METHOD AND APPARATUS FOR TESTING CARBURETORS

Ernst Leunig, Fallersleben; Hans A. Schultze, Giessen, and Christian Pfeifer, Grunberg, all of Germany, assignors to Karl Weiss - Giessen, Fabrik Elektrophysikalischer Geraete, Werk Lindenstruth, Lindenstruth, Germany

Filed Mar. 7, 1974, Ser. No. 448,928
Claims priority, application Germany, Mar. 8, 1973, 2311486
Int. Cl.² G01F *9/00*
U.S. Cl. 73—118 **20 Claims**

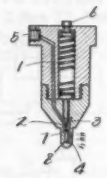


19. A method of testing a device through which a fluid flows and having adjusting means, comprising the steps of imposing a predetermined constant fluid flow through the device; measuring the fluid pressure prevailing at the inlet end of the device; comparing the measured value of fluid pressure with a predetermined value which is prescribed for the predetermined flowthrough of the fluid; and adjusting the adjusting means until said measured value is at least substantially equal to said predetermined value, while maintaining said predetermined constant throughflow.

4,041,778
FUEL INJECTION VALVE TESTING APPARATUS

Hiroaki Ikinobu, Neyagawa, Japan, assignor to Fuji Shoten Co. Ltd., Osaka, Japan

Filed Sept. 8, 1976, Ser. No. 721,468
Int. Cl.² G01M *3/28*
U.S. Cl. 73—119 A **2 Claims**

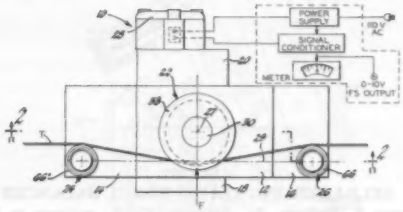


1. A fuel injection valve testing apparatus, comprising an oil pressure booster composed of a high pressure chamber having check valves on opposite sides and a cylinder chamber having a piston for reciprocating a plunger in said high pressure chamber, a fuel injection valve connected to said high pressure chamber of the oil pressure booster, an oil feed pump for feeding low pressure oil into the high pressure chamber and cylinder chamber of the oil pressure booster, and a switching valve for feeding low pressure oil from said oil feed pump alternately into oil inlet-outlet ports on opposite sides of the cylinder chamber, the arrangement being such that after the high pressure chamber of the oil pressure booster and the fuel injection valve are filled with low pressure oil, a high pressure is produced in the high pressure chamber and in the fuel injection valve and this high pressure oil is used to operate the fuel injection valve.

4,041,779
PNEUMATIC TENSION GAUGE

William H. Greb, Sandusky, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Sept. 8, 1976, Ser. No. 721,518
Int. Cl.² G01L *5/08*
U.S. Cl. 73—144 **3 Claims**



1. A tension gauge for measuring the tension in a running thread comprising

a support having a pair of laterally spaced idler rolls mounted thereon for rotation about spaced parallel axes,

a reaction roll mounted on said support intermediate said pair of idler rolls for rotation about an axis parallel to and intermediate said parallel axes,

said rolls being arranged such that a thread running under tension in driving engagement with the three rolls exerts a radial force on the reaction roll,

pneumatic means for rotatably supporting said reaction roll including an annular layer of pressurized gas between stationary and rotary members of the reaction roll, and

signal means responsive to the pressure in said annular layer of gas at diametrically opposed points located in a plane intersecting the plane defined by the spaced parallel axes of the idler rolls.

4,041,780
METHOD AND APPARATUS FOR LOGGING EARTH BOREHOLES

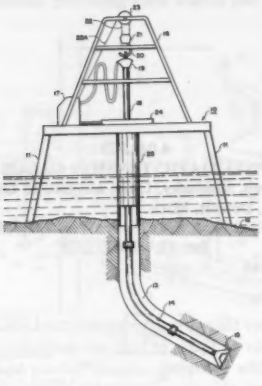
Jorg August Angehrn, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed May 3, 1976, Ser. No. 682,940
Int. Cl.² E21B *47/00*
U.S. Cl. 73—151 **15 Claims**

12. A well logging apparatus adapted to be pumped down through a string of tubular goods located within an earth borehole, comprising:

an elongated body member having at least one logging module and electrical circuitry therein, said body member also including an accelerometer for activating at least a portion of said electrical circuitry; and

pressure-responsive means within said body member for activating at least a portion of said electrical circuitry.

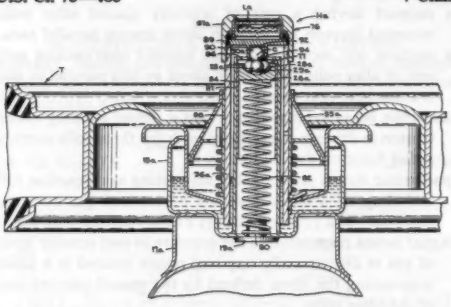


4,041,781

SELF-LEVELING STATIC WHEEL BALANCER

Thomas E. Roberts, Jr., Saratoga, Calif., assignor to FMC Corporation, San Jose, Calif.

Filed Nov. 20, 1975, Ser. No. 633,779
Int. Cl.[2] G01M *1/04*
U.S. Cl. 73—483 7 Claims



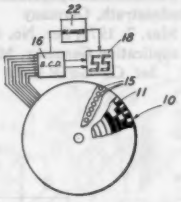
1. In a wheel balancer of the type comprising a post having a generally vertical axis, means for supporting said post on the floor, a wheel balance head having means for mounting and centering a wheel to be balanced in a plane that is normally horizontal, a level on said head, and universal pivot means for mounting said balance head on said post for freely accommodating tilting of said balance head plane relative to said post about a pivot point in response to wheel unbalance, the pivot point of said balance head plane being coincident with the axis of said post when the post axis is vertical; the improvement wherein said pivot includes a pivot ball, means for mounting said pivot ball on said balancing head, said post having an anvil formed with a concave spherical surface, at least three equal diameter support balls on said anvil for supporting said pivot balls, said anvil surface and said pivot ball normally being the sole confining means for said support balls, the radius of curvature of said spherical anvil surface equaling the sum of the radius of said pivot ball and the diameter of a support ball, the center of curvature of said concave surface being coincident with the center of said pivot ball for maintaining the pivot point of said balance head plane coincident with said post axis when the post axis is inclined from the vertical as well as when the balance head plane is tilted from the horizontal.

4,041,782

HOOD-MOUNTABLE DIGITAL SPEEDOMETER

Elmer J. Hingst, 521 Center St., Waukegan, Ill. 60085

Filed Aug. 3, 1976, Ser. No. 711,418
Int. Cl.[2] G01P *1/06, 1/08*
U.S. Cl. 73—493 3 Claims



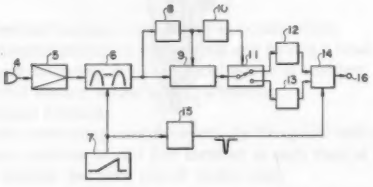
1. A hood-mountable digital speedometer comprising:
analog-to-digital converter means couplable to a speed-indicator of a vehicle-mountable speedometer for converting a position of the speed-indicator into a binary number;
binary-to-decimal number converter means connected to said analog-to-digital converter means for converting the binary number into a decimal number, wherein the speed-indicator is movable over a region of excessive speed of the speedometer, and said analog-to-digital converter means converts only the position of the speed-indicator in the excessive speed-region to the binary number;
display means mountable on the hood of a vehicle for displaying the decimal number; and
a blinker circuit interconnected between said analog-to-digital converter means and said display means for periodically flashing the displayed decimal number on and off, whereby said display means is disposed in a direct line of vision of a vehicle operator.

4,041,783

SYSTEM FOR MEASURING VIBRATION FREQUENCY OF VIBRATING OBJECT

Minoru Shimauchi, Hamamatsu, and Takashi Onoda, Hamakita, both of Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Mar. 1, 1976, Ser. No. 662,687
Claims priority, application Japan, Mar. 5, 1975, 50-25885; Apr. 22, 1975, 50-58146
Int. Cl.[2] G01H *13/00;* G10G *7/02*
U.S. Cl. 73—552 6 Claims



1. A method for measuring the fundamental frequency of a vibrating object, comprising the steps of:
a. detecting the vibration of said vibrating object and converting the detected vibration to an electric signal;
b. deriving harmonic components of said vibrating object from said electric signal;
c. measuring the frequencies of the derived harmonic components; and
d. obtaining the difference between those frequencies, among the measured frequencies which correspond to any adjacent two harmonic components among said measured harmonic components,

in which said step b) is accomplished by passing said electric signal through a variable band-pass filter whose middle frequency of pass band is varied successively; and

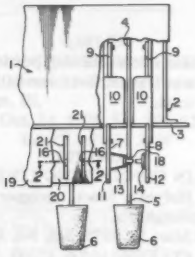
said step c) is accomplished by measuring the frequency of the output of said filter at each time a peak develops in the output of said variable band-pass filter.

4,041,784

ACTUATOR FOR PUSH BUTTON TUNER

Tamaki Ohashi, Tanashi, Japan, assignor to Nihon Technical Kabushiki Kaisha, Japan

Filed May 15, 1975, Ser. No. 577,712
Claims priority, application Japan, May 20, 1974, 49-55376
Int. Cl. F16H *35/18*
U.S. Cl. 74—10.33 **3 Claims**



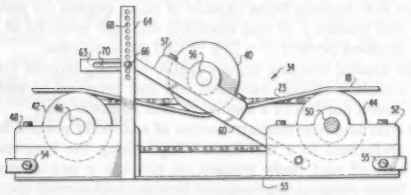
1. An actuator for a pushbutton tuner comprising: a pushbutton slide; a pair of slideable tuning slides; interconnecting means for selectively connecting said pushbutton slide with either one of the pair of tuning slides; and movable shift means for controlling the interconnecting means, said interconnecting means including a pair of interconnecting members, each interconnecting member including a body portion comprised of flexible material secured at one end on the respective tuning slide, means at the other end of the body portion for selectively engaging with said pushbutton slide, and means responsive to movement of said shift means for effecting movement of one of said interconnecting members to is operative position and movement of the other to its inoperative position.

4,041,785

MECHANICAL DRIVE SYSTEM FOR A REMOTE AREA

Thomas J. Roark, SR 2 Box 77, Nettie, W. Va. 26681

Filed July 7, 1976, Ser. No. 703,202
Int. Cl.² F16H *37/00, 7/00*; B65G *23/00*
U.S. Cl. 74—11 **10 Claims**



1. A system for obtaining mechanical power in a mine serviced by conveyor structure including a driven conveyor belt with a flight for removing mined material and a return flight, the system comprising,

power take-off apparatus with means for positioning such apparatus in contiguous relationship to the conveyor structure,

such power take-off apparatus including

driveable roller means,

framework structure for positioning the driveable roller means so as to be driven by the return flight of the conveyor belt,

belt tensioning means for selectively urging such conveyor belt to drive such roller means, and

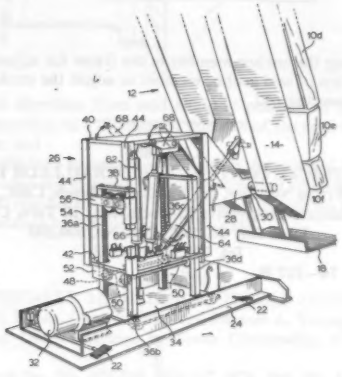
a power shaft driven in response to rotation of such roller means for delivering mechanical drive power to auxiliary equipment.

4,041,786

LINEAR MOTION DEVICES

Hermann Freidrich Offterdinger, 602 Galway Drive, Burlington, Ontario, Canada

Filed Dec. 30, 1975, Ser. No. 645,433
Int. Cl.² F16H *19/04*
U.S. Cl. 74—29 **7 Claims**



1. A linear motion device comprising first and second members movable linearly relative to each other, four mutually-spaced parallel rack members carried by the first member, four mutually-spaced pinion members mounted by the second member each in engagement with a respective rack member for movement along the respective rack member upon rotation about its axis, two shafts each connecting two of the pinion members for rotation simultaneously with one another, and a stabilising member mounted by the second member spaced a substantial distance from the first-mentioned pinions and comprising at least two further pinions engaged with two different rack members and with one another.

4,041,787

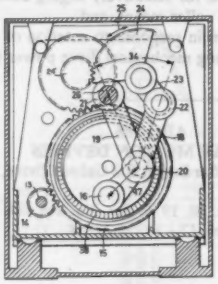
GEAR UNIT FOR THE TRANSFORMATION OF A UNIFORM ROTARY MOVEMENT TO A STEP OR STROKE MOVEMENT

Hans Josef Brundler, Kantonstraase, CH-8863 Buttikon, Switzerland

Filed Apr. 24, 1975, Ser. No. 570,763
Claims priority, application Germany, Apr. 25, 1975, 2420116
Int. Cl.² F16H *29/04*
U.S. Cl. 74—117 **11 Claims**

1. A geared transmission for converting continuous rotary motion into intermittent and adjustable motion and comprising; a frame, an input shaft in said frame adapted for being driven continuously in one direction, a rotary element in said frame continuously coupled to said input shaft, a crank pin eccentrically located on said rotary element, a link having one end connected to said crank pin, first and second reciprocable connecting rods each having one end pivotally connected to the other end of said link, a rotary driven member in said frame, drive means including a one-way drive clutch connecting said driven member to the other end of said first connecting rod so the driven member is driven in one direction of movement of the first connecting rod and is stationary in the other

direction of movement thereof, an anchor member connected to the other end of said second connecting rod, and means



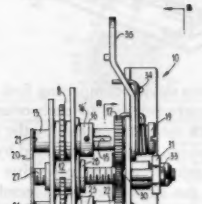
supporting the anchor member in the frame for adjustment of the position of said anchor member to adjust the stroke of said first connecting rod.

4,041,788

ELECTRICAL CONTROL FOR DERAILLEUR DRIVE

Nathan Vivien Nininger, Jr., Manhattan Beach, Calif., assignor to California Progressive Products, Inc., El Toro, Calif.

Filed July 30, 1975, Ser. No. 600,303
Int. Cl.[2] F16H 7/22
U.S. Cl. 74—217 B **8 Claims**



1. In a derailleur gear changing system including a main drive sprocket, a plurality of rear sprocket gears, and a connecting drive chain, the combination comprising:

a. means for laterally displacing said drive chain by means of power derived solely from the motion of said drive chain;

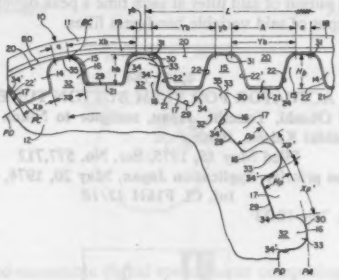
b. control means to start the shifting of said chain displacing means, and to automatically shut off the shifting operation upon completion of a gear-ratio change.

4,041,789

BELT DRIVE INCLUDING TOOTHED BELTS AND TOOTHED PULLEYS OF IMPROVED TOOTH CONFIGURATIONS

Ronald D. Hoback, Lincoln, Nebr., assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Dec. 18, 1975, Ser. No. 642,089
Int. Cl.[2] F16G 1/28; F16H 55/30, 7/00
U.S. Cl. 74—229 **43 Claims**

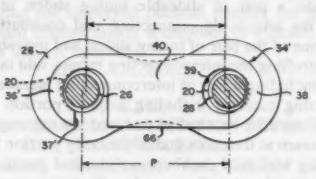
1. A flexible power transmission belt having a plurality of flexible resilient teeth of uniform pitch length extending transversely thereof, each said tooth as viewed in longitudinal section comprising a base portion, an outermost portion spaced from said base portion and having a cross sectional dimension less than the cross sectional dimension of said base portion and opposite side portions extending from the ends of said base portion and converging inwardly to meet the ends of the outermost portion to thereby define the tooth profile, each said side portion including an integral stress-relieving portion adjoining

the base portion, said stress-relieving portion having an outer perimeter which is at least 30% of one half of the total outer perimeter of said tooth.

4,041,790

ROLLER CHAIN CONNECTING LINK SPRING CLIP

William T. Paul, Holyoke, Mass., assignor to Incom International Inc., Pittsburgh, Pa.

Filed Mar. 18, 1975, Ser. No. 559,497
Int. Cl.[2] F16G 13/06, 15/00, 15/08
U.S. Cl. 74—258 **8 Claims**



1. A spring clip for selective installation on and removal from a pair of adjacent pins of a roller chain which said adjacent pins have a predetermined distance therebetween, each said pin having a recessed portion inwardly of an extended end, said spring clip comprising:

a body portion formed of sheet spring metal and having first and second ends and an intermediate section therebetween;

said first and said second ends of said body portion respectively having first and second openings therethrough;

said first opening being capable of being aligned for installation inwardly of said extended end and received at said recessed portion of a first of said adjacent pins;

said second opening being capable of being aligned for installation of said extended end and received at said recessed portion of a second of said adjacent pins;

at least said intermediate section of said body portion being preformed to a non-linear shape along the longitudinal axis of said body portion to provide a predetermined linear distance between said first and said second openings which said predetermined linear distance is different for said predetermined distance between said adjacent pins to prevent said openings from being simultaneously aligned with and received on their respective said adjacent pins;

said first and said second openings being capable of simultaneous said alignment with and receipt on said respective said adjacent pins by deformation of said non-linear shape of said intermediate section to provide a desired linear distance between said openings which is different from said predetermined linear distance and generally corre-

sponds to said predetermined distance between said adjacent pins; and

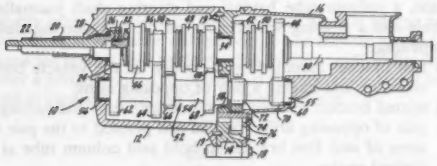
said non-linear shape of said intermediate section tending to re-establish said predetermined linear distance between said openings when said openings are simultaneously respectively received at said recessed portions of said adjacent pins to prevent inadvertent removal of said spring clip from said adjacent pins wherein said first end only partially encircles said first of said adjacent pins at said recessed portion by said first opening extending generally perpendicularly to one side of said body portion and said first opening allows said body portion to be rotated around said second end in a direction away from said one side when said non-linear shape of said intermediate portion is deformed to approach said desired linear distance between said openings.

4,041,791

METHOD OF MANUFACTURING A TRANSMISSION

Merle Dalton Coy, Muncie, Ind., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Oct. 14, 1975, Ser. No. 622,588
Int. Cl.² F16H *3/08*
U.S. Cl. 74—325 **4 Claims**



1. A method of assembling a transmission having a case supporting first mainshaft and countershaft bearings, a center support supporting second mainshaft and countershaft bearings, and an extension housing supporting a third countershaft bearing and defining a bore, the method comprising the steps of mounting a mainshaft assembly on the center support with its mainshaft journalled in the second mainshaft bearing, mounting a cluster gear assembly having a one-piece countershaft on the center support with its countershaft journalled in the second countershaft bearing, mounting a reverse idler gear assembly on the center support with its reverse idler gear shaft press fit in the center support, slipping the case over the mainshaft and cluster gear assemblies to abut one side of the center support with the input shaft of the mainshaft assembly and the countershaft journalled respectively in the first mainshaft and countershaft bearings, slipping the extension housing over the mainshaft, countershaft, and reverse idler gear assemblies to abut the other side of the center support with the countershaft journalled in the third countershaft bearing and the reverse idler gear shaft slip fit in the bore, adjusting the extension housing relative to the center support to eliminate preloads on the bearings, and securing the case, center support and extension housing together.

4,041,792

DRIVE DISCONNECT DEVICE

Calvin L. Miller, Aurora, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

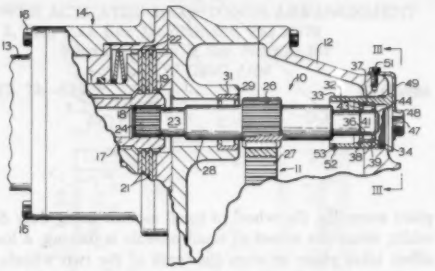
Filed Nov. 1, 1976, Ser. No. 737,642
Int. Cl.² F16H *57/00*
U.S. Cl. 74—405 **3 Claims**

1. A drive disconnect device for a power train of the type contained within a housing and having a rotary driving member normally engaged with a rotary driven shaft through a spline connection to transmit power therebetween, the drive disconnect device comprising:

means forming a threaded bore in the housing in alignment with the driven shaft;

a cage having an external thread formed thereon and threadably extending through the threaded bore;

means for rotatably attaching the driven shaft to the cage so that rotating the cage slidably moves the driven shaft in an



axial direction from said engaged position of the spline connection to a disengaged position of the spline connection; and

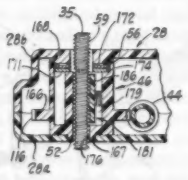
yieldable stop means disposed within the external thread of the cage and engageable with the housing when the driven shaft reaches the disengaged position to provide increased resistance to the rotation of the cage.

4,041,793

ELECTRICALLY ADJUSTABLE VEHICLE ACCESSORY

Laszlo N. Repay, Chagrin Falls, and Thomas A. Young, Burton, both of Ohio, assignors to Tenna Corporation, Cleveland, Ohio

Division of Ser. No. 470,569, May 16, 1974, Pat. No. 3,972,597.
This application May 12, 1976, Ser. No. 685,698
Int. Cl.² F16H *1/18, 55/22;* B62D *1/20;* F16C *1/10*
U.S. Cl. 74—424.8 R **6 Claims**



1. A drive nut for use with a screw, comprising a body with a central passage in which a screw is receivable, means carried by said body in a position to act against external threads of a screw in said central passage to drivingly interconnect the body with a screw so that relative rotation between the screw and body will move one relative to the other in a direction axially of the screw, said means being yieldable from a position at least partially within said passage in engagement with the threads of a screw to a position radially outwardly therefrom out of engagement with the threads in response to relative axial movement between the two without relative rotation or in response to relative rotation between the two without relative axial movement.

4,041,794

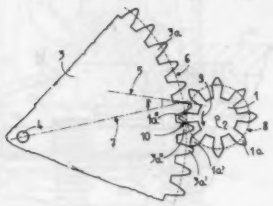
MECHANISM OF TRANSMISSION

Michel Belot, Boudry, and Norberto Perucchi, Saint-Blaise, both of Switzerland, assignors to Ebauches S.A., Switzerland

Filed Oct. 20, 1976, Ser. No. 733,994
Int. Cl.² F16H *55/04, 55/06*
U.S. Cl. 74—460 **10 Claims**

1. Mechanism of transmission comprising two toothed

wheels meshing with each other, characterized by the fact that the module of one of the said wheels is greater of 10 to 20% than this one of the other wheel, so that, when the wheel of great module is driving, the rotation of the mechanism takes



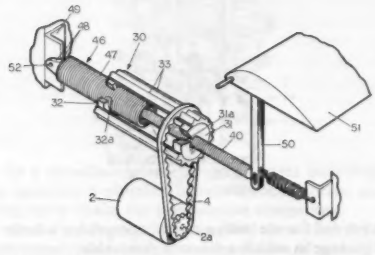
place normally, the wheel of small module being duly driven while, when the wheel of small module is driving, a locking effect takes place between the teeth of the two wheels, preventing any rotation.

4,041,795

MECHANISM FOR CONVERTING ROTARY MOTION INTO PRECISE LOW SPEED LINEAR MOTION

Michael George Rekoff, Jr., Huntsville, Ala., assignor to Teledyne Brown Engineering, Huntsville, Ala.

Filed Jan. 29, 1976, Ser. No. 653,572
Int. Cl.² F16H *1/18*
U.S. Cl. 74—424.8 B **2 Claims**



1. Mechanism for converting continuous rotary motion into a relatively slow speed rectilinear motion comprising:

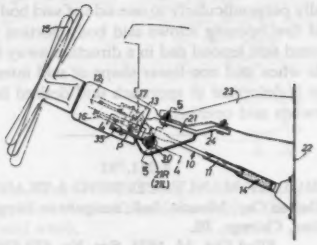
1. a thread carrying output rod fixed against rotation but free to shift in an axial direction;
2. a second thread carrying rod fixed against both axial and rotational movements and positioned with its axis parallel to the axis of said first thread carrying rod, one of said rods being hollow and dimensioned to freely surround said other rod;
3. a hollow cylindrical member supported by said first and second thread carrying rods, said cylindrical member defining a first internal thread means co-operating with the threads on said first thread carrying rod and a axially spaced second internal thread means co-operating with the threads on second threaded rod, and
4. means for continuously rotating said cylindrical member in either direction, whereby said output rod is axially shifted as a function of the difference of the thread pitches of said output rod and said second rod.

4,041,796

FASTENING DEVICE FOR TILTABLE STEERING WHEEL ASSEMBLY

Yoshio Shishido, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Dec. 17, 1975, Ser. No. 641,531
Claims priority, application Japan, Dec. 28, 1974, 50-1773[U]
Int. Cl.² B62D *1/16*
U.S. Cl. 74—493 **8 Claims**



1. A fastening device for a tiltable steering wheel assembly including a steering shaft tiltably connected to steering gear means, a column tube having said steering shaft journalled therein and a steering wheel mounted on said steering shaft, comprising:

a first bracket mounted on a portion of the vehicle body structure and having a pair of opposing arms;
a second bracket secured to said column tube and having a pair of opposing arms coupled and pivoted to the pair of arms of said first bracket to hold said column tube at a desired angle;
a fastening bolt extending transversely across the coupled portions of said first and second brackets;
a lock nut threaded on one end of said bolt at one side of the coupled portions of said first and second brackets;
a pressure plate slidably mounted on the other end of said bolt at the other side of the coupled portions of said first and second brackets;
a cam element pivoted on the other end of said bolt about an axis substantially perpendicular to the longitudinal axis of the bolt, said pressure plate being between said cam element and the coupled portions of said first and second brackets, said cam element including a curved cam surface to press said pressure plate towards said lock nut and a flat surface to be pressed against said pressure plate in the locked position, the center of the curved cam surface being eccentric with respect to the pivot axis of said cam element to engage the flat surface of said cam element with said pressure plate beyond the rotary dead point of said cam element; and
a locking lever integrally connected to said cam element to be positioned substantially parallel with respect to said column tube in a locked position thereof whereby when said locking lever is set in the locked position, said first and second brackets are fastened to each other between said lock nut and said pressure plate which is pressed by the flat surface of said cam element and the pressing contact of said pressure plate and said cam element is held due to a reaction force generated on said bolt.

4,041,797

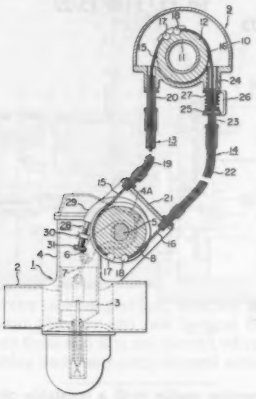
THROTTLE-VALVE OPERATING DEVICE FOR A CARBURETOR

Shigeo Mito, Yokohama, Japan, assignor to Kabushiki Kaisha Keihinseiki Seisakusho, Kawasaki, Japan

Filed Sept. 5, 1975, Ser. No. 610,732
Int. Cl.² F16L *5/10*
U.S. Cl. 74—501 R **2 Claims**

1. A throttle-valve operating device for a carburetor, of the

type including a throttle-valve actuating member rotatably mounted on the carburetor, a manual control member rotatably supported exteriorly of the carburetor, and a throttle operating wire interconnecting said actuating member and said control member; the device comprising a tubular flexible guide



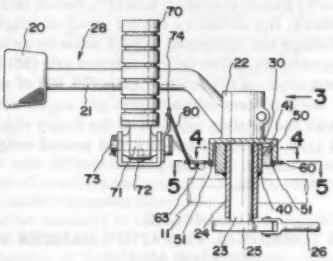
slidably covering said wire and including a guide having two portions axially slidable with respect to one another and spring means for biasing said guide portion in an extending direction under a predetermined pressure, said flexible guide being held fixed at opposite ends and flexed therebetween.

4,041,798

PARKING BRAKE

Takashi Shinozaki, Tokorozawa, and Susumu Asai, Sayama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed June 11, 1976, Ser. No. 695,156
Claims priority, application Japan, June 17, 1975, 50-82135
Int. Cl.[2] G05G *1/14, 5/06*; B60T *7/04*
U.S. Cl. 74—512 **7 Claims**



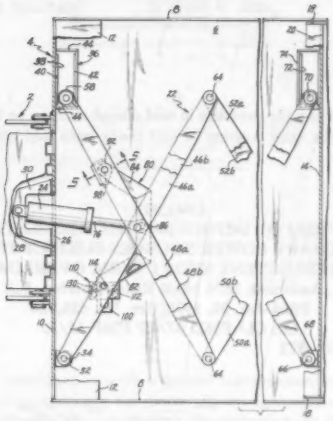
1. A parking brake mechanism for a vehicle of the type having a brake pedal which is to be turned in a predetermined direction for applying a brake on the vehicle, the parking brake mechanism comprising, in combination, a ratchet wheel connected to said brake pedal for simultaneous rotation therewith, said ratchet wheel having a series of ratchet teeth formed thereon, a pawl movable between a first position where said pawl engages said ratchet teeth on said ratchet wheel for permitting said brake pedal to be turned in said predetermined direction only and a second position where said pawl disengages said ratchet teeth on said ratchet wheel, resilient means yieldably urging said pawl toward said first position, cam means for normally holding said pawl in said second position against the force of said resilient means, said cam means being displaceable with respect to said pawl for permitting same to be moved from said second to said first position by said resilient means, and means actuated by a vehicle operator to cause displacement of said cam means with respect to said pawl.

4,041,799

POWER ACTUATED LAZY-TONGS ARRANGEMENT

John J. Teti, P.O. Box 756, Saltville, Va. 24370

Filed Oct. 7, 1975, Ser. No. 620,287
Int. Cl.[2] G05G *1/04*
U.S. Cl. 74—521 **12 Claims**



1. A power actuated lazy-tongs arrangement, comprising: lazy-tongs means, including a pair of base leg means; relatively fixed base means; bracket means connecting the mounting ends of said base leg means with said base means, and arranged to provide for scissors-like movements of said base leg means; bridge means connected to extend between said base leg means, and arranged to accommodate said scissors-like movements, said bridge means including a rigid bridge element, one end of said rigid bridge element being connected with one of said base leg means by a fixed pivot arrangement, and the other end of said rigid bridge element being connected to the other of said base leg means by a fixture providing for both pivotal and sliding movement between said bridge element and said other base leg means; and power piston means connected to the central portion of said bridge means, and operable to apply force thereto for extending and collapsing said lazy-tongs means, said bridge means being effective to apply such force substantially simultaneously and equally to both of said base leg means.

4,041,800

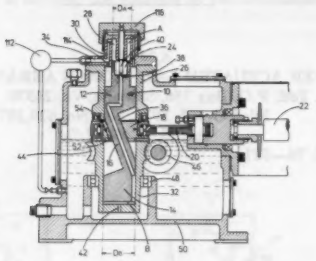
STROKE LENGTH ADJUSTING DEVICES

Ryuichi Sato; Teruo Oikawa, and Masahiro Nakata, all of Tokyo, Japan, assignors to Nikkiso Co., Ltd., Tokyo, Japan

Filed Aug. 27, 1975, Ser. No. 608,223
Claims priority, application Japan, Apr. 7, 1975, 50-42093; Apr. 7, 1975, 50-42094
Int. Cl.[2] G05G *1/00*
U.S. Cl. 74—571 R **8 Claims**

1. Apparatus for converting rotary motion into reciprocating motion, comprising a housing, rotating crank means axially movable within said housing and adapted to be coupled to a linearly movable member, said crank means being connected to a pair of opposed rotating bodies cooperating with said housing to form pressure chambers, means for supplying a fluid

media to one of said pressure chambers and duct means extending between said pressure chambers to communicate with each



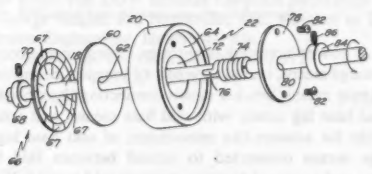
other whereby the pressure in said chambers may be balanced to adjust the axial position of said crank with said housing.

4,041,801

MECHANISM OF IMPROVING THE REGULATION OF ROTARY POWER SOURCES SUBJECT TO INTERMITTENT SHORT TERM OVERLOAD

Warren A. Anderson, 1874 Main Road, Tiverton, R.I. 02878

Filed Jan. 21, 1976, Ser. No. 651,014
Int. Cl.[2] F16D *67/00*; F16F *15/10*
U.S. Cl. 74—572 **2 Claims**



1. A power driven regulated rotary system comprising:

a shaft adapted to be driven at a rotating velocity for supplying rotational power;

a variable load including an electrical power source mechanically connected to said shaft for receiving said rotational power; and

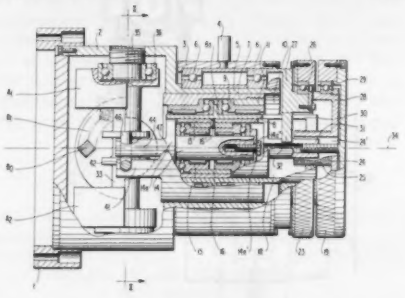
a supplementary power supply, adapted for rotation, having a first coupling means connected to said shaft for slowly accelerating said supplementary power supply to shaft speed, said supplementary power supply receiving and storing energy when said shaft rotates at a velocity higher or equal to said supplementary power supply and said supplementary power supply having a second coupling means for connecting rigidly said supplementary power supply to said shaft for delivering power to said variable load on an overload by said variable load causing said shaft rotational velocity falling below the rotational velocity of said supplementary power supply, said supplementary power supply further comprises an inertial element, a slidable friction coupling device coupling said inertial element to said shaft, said slidable friction coupling device further comprises a frictional disc abutting said inertial element, and a spring finger washer frictionally abutting said friction disc and rigidly connected to said shaft, a clutch adapted to connect rigidly said inertial element to said shaft upon said inertial element rotating at a higher velocity than said shaft, said clutch further comprises a wire sping wound around said shaft and affixed to said inertial element, and a collar adapted for positioning said supplementary power supply.

4,041,802

BALANCING APPARATUS, PREFERABLY FOR GRINDING WHEEL

Rolf Brorsson Dahlin, Karrgrand 49, 162 46 Vallingby, Sweden

Filed Dec. 1, 1975, Ser. No. 636,462
Claims priority, application Sweden, Dec. 2, 1974, 7415037
Int. Cl.[2] F16F *15/22*
U.S. Cl. 74—573 **4 Claims**



1. In an apparatus usable with a rotatable object such as a grinding wheel, to balance an object during its rotation, having members mounted co-rotary with the object, members mounted non-co-rotary therewith, a plurality of weights (A_1, A_2, B_0, B_1 and B_2) coupled to the co-rotary members, said weights having their respective centers of gravity arranged displaceable relative to planes through the axis of rotation **(34)** of the object, actuating means coupled to the weights and supported by the non-co-rotary members, said actuating members displaceable along the axis of rotation, said weights being adapted for rotation about a pair of axles **(35, 37)**, said axles extending angularly in relation to the axis of rotation **(34)**, co-operating portions **(44, 43** and **40, 41, 42)** on said actuating means and weights provided with toothed elements **(43, 45)**, by which rotation of the weights is effected, the improvement comprising: two of said plurality of weights (A_1, A_2) defining a first group of weights, and each of disc-shape and connected to each other by a central rotation axle **(37)**, two of said plurality of weights (B_1, B_2), defining a second group of weights, and each of disc-shape and connected to each other by an intermediate bow portion (B_0) offset from a rotation axle **(35)** for said second group, wherein the rotation axles **(35, 37)** of said first and second weights form substantially right angles with each other and with the rotation axis **(34)** of the rotary object, and the rotation axles **(37, 35)** of said first and second weights are located substantially in the same plane.

4,041,803

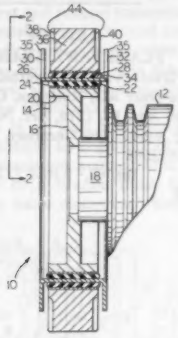
RUBBER TORSIONAL VIBRATION DAMPER WITH COOLING MEANS

Alexander Goloff, East Peoria, and Mark Frederick Sommars, Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 1, 1975, Ser. No. 636,509
Int. Cl.[2] F16D *15/12*
U.S. Cl. 74—574 **10 Claims**

1. A torsional vibration damper for a rotary member comprising a hub member adapted to be mounted upon the rotary member for rotation therewith, a first vibratory movement energy absorbing and dissipating element means mounted upon said hub member, a cooling fin means mounted upon said first energy absorbing and dissipating element, a second vibratory movement energy absorbing and dissipating element means mounted upon said cooling fin means, a generally ring-shaped inertia member defining a pair of radially directed side surfaces mounted upon said second vibratory movement energy absorbing and dissipating element means, a plurality of radially

directed, integral cooling fins on said side surfaces, and wherein said cooling fin means comprise a first and a second plurality of cooling fins positioned adjacent to said side surfaces and thereby said integral fins, whereby air flow past said first and second plurality and said integral fins provides for heat flow away from said first and second vibratory movement energy absorbing and dissipating element means.



4,041,804

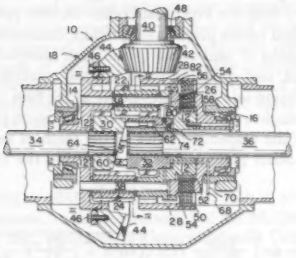
LIMITED SLIP DIFFERENTIAL WITH CLUTCH CONTROL MEANS

Ralph B. Clark, Morton, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 513,735, Oct. 10, 1974, abandoned. This application May 26, 1976, Ser. No. 690,111

Int. Cl.² F16H *1/44*

U.S. Cl. 74—711 **5 Claims**



1. A new differential comprising:

a pair of coaxially juxtaposed axle gears, each mounted on a rotatably mounted drive axle;

a carrier mounted in said differential for rotation relative to the drive axles;

a plurality of first planet gears rotatably mounted on the carrier, each being in meshing engagement with one of the axle gears;

a plurality of second planet gears rotatably mounted on the carrier, each being in meshing engagement with the other of the axle gears and with the first planet gears;

a floating ring gear engaging one of said plurality of planet gears and mounted for rotation thereabout;

a fluid pressure actuable clutch means for coupling the ring gear to the carrier;

cam means rotatable with one of the axle gears,

fluid piston pump means engaging said cam means and rotatable with the other axle gear; and

fluid passage means communicating the fluid piston pump with the clutch means,

whereby relative rotation between the axle gears causes the fluid piston pump means to be actuated by the cam means to communicate fluid pressure to the clutch to actuate the clutch to resist relative rotation of the carrier and ring gear.

4,041,805

CHANGE GEAR TRANSMISSION IN GROUP ARRANGEMENT FOR MOTOR VEHICLES, ESPECIALLY FOR USE IN AGRICULTURE AND IN THE CONSTRUCTION FIELD

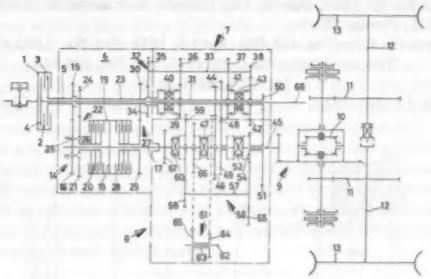
Dieter Jochmann, Hurth-Gleuel, Germany, assignor to Klockner-Humboldt-Deutz Aktiengesellschaft, Cologne, Germany

Filed Mar. 3, 1975, Ser. No. 554,433

Claims priority, application Germany, Mar. 2, 1974, 2410164

Int. Cl.² F16H *37/00*; F16D *3/44, 13/22*

U.S. Cl. 74—740 **4 Claims**



1. In combination with a geared transmission in group arrangement, especially for motor driven agricultural and construction vehicles; a primary group having an input shaft adapted for connection to a source of power by a selectively operable friction clutch and an output shaft, a countershaft and a primary friction clutch member fixed on said countershaft, a pair of first gears rotatable on said countershaft, one on each side of said primary clutch member and a pair of secondary friction clutch members each connected to one of said first gears for selective cooperation with said primary friction clutch member, a pair of second gears fixed to said output shaft and each meshing with one of said first gears, so that selective engagement of one of said secondary friction clutch members with said primary friction clutch member will drive said output shaft through one of said first gears meshing with one of said second gears, another pair of meshing gears fixed to said input shaft and said countershaft, respectively, in a plane adjacent the plane of one pair of said first and second meshing gears, and coupling mechanism carried by said gear on said countershaft and the first gear in the adjacent plane comprising movable means on one of the said gears movable to engage cooperating means on the other of the said gears for driving the said first and second gears in a plane adjacent said another pair of meshing gears and said output shaft independently of said primary and secondary disengageable friction clutch members bypassed thereby, said transmission including means for connecting said output shaft to a load to be driven.

4,041,806

TESTING CORD-TO-ELASTOMER ADHESION

Kenneth K. Klar, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

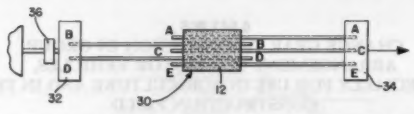
Filed Oct. 18, 1976, Ser. No. 733,583

Int. Cl.² G01M *19/00*

U.S. Cl. 73—159 **8 Claims**

1. A method of testing a cord-to-rubber adhesion comprising selecting a specimen of cords embedded in a rubber matrix, said specimen having three parallel cords, applying a force longitudinally of the first cord in a first direction and applying

a force to each cord of the pair thereof having the first cord therebetween in a second direction, and measuring the force



required to cause separation between said first cord and said pair thereof.

4,041,807

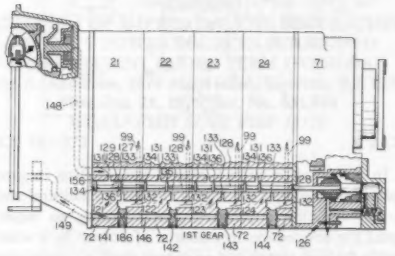
CONTROL SYSTEM FOR A MODULAR TRANSMISSION

Charles H. Herr, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 458,998, April 8, 1974, Pat. No. 3,913,415. This application Aug. 21, 1975, Ser. No. 606,613

Int. Cl.² F16H *3/74*

U.S. Cl. 74—752 C **2 Claims**



1. A power transmission including a plurality of sequentially arranged speed ratio modules, each of the modules comprising

an input shaft,

an output shaft,

a planetary gear set having a sun gear, a ring gear driven by the input shaft and a plurality of planetary gears mounted upon a rotatable carrier and engaged with the ring gear and the sun gear, the output shaft being coupled for rotation with the carrier,

a direct drive clutch selectively operable to cause rotation of the ring gear together with the sun gear,

a reduction drive clutch selectively locking the sun gear against rotation, and

control means for operating both the direct drive clutch and reduction drive clutch in response to a single hydraulic signal,

the power transmission also including a control system comprising

a source of signal fluid under pressure,

conduit means for communicating the signal fluid to each of the speed ratio modules,

a plurality of separate valve means each associated with a speed ratio module for selectively communicating the conduit means with the control means of the respective modules, each separate valve means comprising a valve spool member, the plurality of spool members axially aligned and extending continuously through the sequentially arranged speed ratio modules, and

governor means operatively coupled with a final output drive shaft of the power transmission and one of the valve means to condition all the valve means for sequentially communicating signal fluid to the respective modules relative to operating speed of the output shaft, the governor means comprising operating means for interaction with one end of the continuously extending spool members and hydralic means incrementally responsive to rotating speed of the final output drive shaft for adjusting the operating means and its interaction with the continuously extending spool members.

4,041,808

PLANETARY GEARING

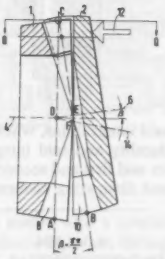
Kurt Gerhard Fickelscher, Frankenthal, Pfalz, Germany, assignor to Balke-Durr AG, Ratingen, Germany

Filed Apr. 14, 1976, Ser. No. 676,702

Claims priority, application Germany, Apr. 15, 1975, 2516474; Nov. 24, 1975, 2552588

Int. Cl.² F16H *1/28*

U.S. Cl. 74—800 **33 Claims**



1. Planetary gearing comprising a rotatable swash plate, at least another toothed plate engaged by said swash plate, said plates being disposed in respective intersecting radial planes having an angle β included therebetween, said plates having on respective faces thereof different numbers of teeth formed on respective conical surfaces, the teeth of said other toothed plate having flanks, extension lines from all of said flanks intersecting in points located on an imaginary circle having an axis coincident with the axis of said other toothed plate, the teeth of said toothed swash plate having flanks, extension lines from all of said flanks of said swash plate teeth intersecting in a common point, said common point, during rotation of said swash plate, defining said imaginary circle as the base of an imaginary cone, an angle $\gamma = 2\pi$ being included between projected radial planes of the respective rows of the teeth of said swash plate and said other plate and being defined in the following equation:

$$\gamma = \arcsin\left[\frac{\cos\alpha}{Z1/Z2}\cdot\left(\pm\sqrt{\sin^2\alpha+\left(\frac{Z1}{Z2}\right)^2-1}-\sin\alpha\right)\right]$$

where

$Z1$ = the number of teeth of the other plate,

$Z2$ = the number of teeth of the swash plate, and

2α = the angle formed between the flanks of a tooth.

4,041,809

MULTIPLE-TRANSMISION-RATIO TRANSMISSION ARRANGEMENT WITH GEAR-SHIFT OVERLAP ACTION OF AUTOMATICALLY VARIED DURATION

Heinrich Dick, Nattheim, and Erhard Kobinger, Giengen, Brenz, both of Germany, assignors to Voith Getriebe KG, Heidenheim, Brenz, Germany

Filed Oct. 10, 1975, Ser. No. 621,634

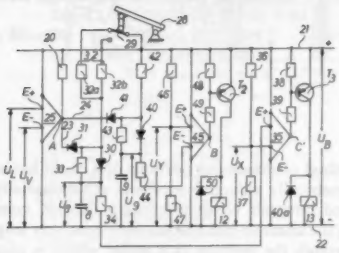
Claims priority, application Germany, Oct. 16, 1974, 2449196

Int. Cl.² B60K *41/18;* F16H *3/74*

U.S. Cl. 74—866 **6 Claims**

1. In a multiple-transmission-ratio transmission arrangement of the type including at least first and second transmission-ratio-establishing units, particularly brakes and/or clutches, having hydraulically activated and unactivated states, the first

and second transmission-ratio-establishing units together establishing a first transmission ratio when concurrently the first unit is in a predetermined one of its hydraulic activation states and the second unit is in a predetermined one of its hydraulic activation states, the first and second transmission-ratio-establishing units together establishing a second transmission ratio when concurrently the first unit is in the other of its hydraulic activation states and the second unit is in the other of its hydraulic activation states, an arrangement for changing the transmission ratio of the transmission arrangement in dependence upon variations in at least one monitored operating parameter of the transmission arrangement or of the engine or motor driving the transmission arrangement, comprising, in combination, a source of hydraulic fluid, first and second electrically controllable valve means each leading from moni-



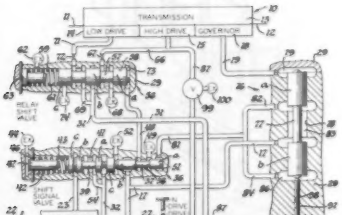
tor signals, respectively, when but only when the associated one of said valve means is in that one of the energization states thereof corresponding to communication of the respective one of said units with said source, and safeguard means operative for receiving said first and second monitor signals and in response to the simultaneous receipt of both a first and a second monitor signal for longer than a preselected time interval operative for effecting deactivation of at least one of said units, wherein said first and second valve means comprise first and second solenoid valves comprised of first and second valve members each being at least in part electrically conductive, and wherein each of said monitoring means comprises a respective monitoring switch whose moving contact is constituted by the electrically conductive part of the valve member of the respective valve.

4,041,810

TRANSMISSION SHIFT CONTROL DEVICE SYSTEM

Kenneth B. Harmon, Indianapolis, and Ted M. McQuinn, Carmel, both of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 17, 1976, Ser. No. 658,399
Int. Cl.² B60K *41/14*
U.S. Cl. 74—868 **7 Claims**



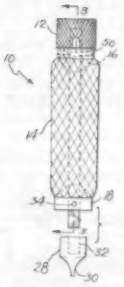
1. In a transmission: multiratio drive means having a low fluid-operated device for establishing a low ratio drive and a high fluid-operated device for establishing a high ratio drive; a source of fluid at regulated pressure; governor means connected to said drive means and providing a governor pressure signal proportional to the speed of said drive means; automatic shift valve means connected to said source, said governor means and said low and high fluid-operated devices, having upshift force hysteresis means and downshift force hysteresis means and normally operative in low position to connect said source to said low fluid-operated device and said high fluid-operated device to exhaust for said low ratio drive and operative in response to said governor pressure signal of increased value to upshift to high position at a predetermined upshift speed to connect said low fluid-operated device to exhaust and to connect said source to said high fluid-operated device for establishing said high ratio drive and in response to said upshift of said shift valve means to actuate said upshift force hysteresis means without time delay to provide an upshift hysteresis force to prevent shift cycling and to actuate said downshift force hysteresis means after a time delay sufficiently longer than the time required for completely establishing said high ratio drive to provide a downshift hysteresis force substantially completely counteracting said upshift hysteresis force acting on said automatic shift valve means after the speed and governor pressure normally increases sufficiently to hold said automatic shift valve means in high drive position and to provide a downshift to said low ratio drive on a subsequent normal speed and governor pressure reduction at a downshift speed substantially the same as said upshift speed.

4,041,811

TORQUE LIMITING DRIVER

Walter F. Durant, 664 Noank Road, Mystie, Conn. 06355

Filed May 10, 1976, Ser. No. 684,929
Int. Cl.² B25B *23/14*
U.S. Cl. 81—52.4 R **8 Claims**



1. A torque-limiting driver, which comprises:

an elongated driven member having means for engaging a workpiece disposed at one end thereof and which is threaded at the other end thereof;

an elongated handle member movably disposed about said driven member and having a pair of clutch surfaces integrally formed one at each end thereof;

a first hub member axially and rotatingly secured to said elongaged driven member at said one end thereof adjacent one of said clutch surfaces of said handle member;

a second hub member rotatingly secured to said elongaged driven member but axially movable therealong adjacent the other of said pair of clutch surfaces; and

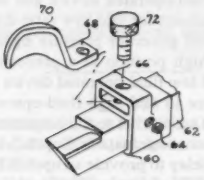
knob means threadingly secured to said other end of said elongated driven member adjacent said second hub member for permitting adjustment of the frictional fit between each of said hub members and their respective, adjacent clutch surfaces of said handle member.

4,041,812

SHIELD ELEMENT

Joseph F. Jioio, R.D. No. 6, Mount Odin Heights, Greensburg, Pa. 15601, and Willis Howard Gardner, 823 Graham St., Belle Vernon, Pa. 15012

Filed June 29, 1976, Ser. No. 700,920
Int. Cl.[2] B23B *27/00*
U.S. Cl. 82—34 R 2 Claims



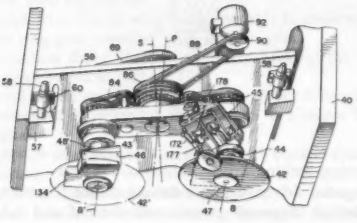
1. A chip shield, especially adapted for use with a turning tool having a chip taking cutting edge, comprising; a transparent element, support means near the lower edge of said element for supportingly and adjustably connecting the element to a cutting tool in a position to intercept chips taken by said cutting edge, said support means comprising a perforated tab projecting from the lower part of said element on the opposite side thereof from the cutting edge of the tool and a holder for the element, said holder comprising a first loop slidably receivable on a turning tool and a second loop integral with said first loop on top thereof for receiving said tab, said holder having a threaded aperture therein extending through said second loop and a wall of said first loop, and a clamp screw threaded into said aperture and extending through said perforation in said tab for securing the tab to the holder and clamping the holder to a tool on which the holder is mounted.

4,041,813

METHOD AND APPARATUS FOR TRANSVERSE CUTTING

Harvey J. Spencer, Green Bay, Wis., assignor to Paper Converting Machine Company, Green Bay, Wis.

Filed Feb. 17, 1976, Ser. No. 658,181
Int. Cl.[2] B26D *1/56*; B23D *25/02*
U.S. Cl. 83—14 5 Claims



1. A method of cutting logs of convolutely wound web material, comprising:

uniformly advancing a log along a path into a cutting station having an arm above said path,

rotating said arm about an axis skewed with respect to said path, said arm having a disc blade mounted thereon with the blade axis spaced from the arm axis to cause said blade to intersect said path and cut a log, maintaining said blade axis at an angle skewed relative to said arm axis to position said disc blade continually perpendicular to said path whereby said disc blade makes a square cut through a log, and

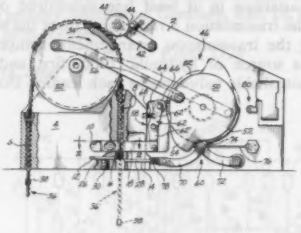
continuously planetarily rotating said disc blade about the blade axis from said arm axis.

4,041,814

METHOD AND DEVICE FOR DISPENSING PORTIONS OF A CHAIN

Cliff High, Tacoma, Wash., assignor to Morley Brotman, Tacoma, Wash.

Division of Ser. No. 628,399, Nov. 3, 1975. This application Sept. 16, 1976, Ser. No. 723,945
Int. Cl.[2] B26D *5/40*
U.S. Cl. 83—18 4 Claims



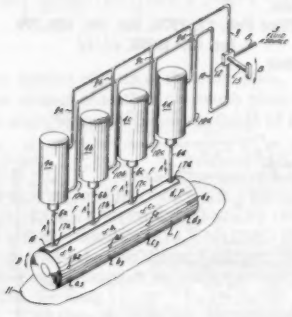
1. A method of dispensing portions of a chain having relatively diametrically enlarged segments at substantially regularly spaced intervals along the length thereof, comprising supporting the chain so that it is movable relatively lengthwise thereof through the opening in a collar which is capable of being opened and closed about the chain, and the opening of which has a diameter of less than that of the relatively enlarged segments of the chain in the closed condition of the collar, advancing the chain lengthwise in the direction of the collar when the collar is open, to the extent that a portion of the chain including one segment therein, is fed through the opening in the collar and assumes a position on the opposite side thereof, closing the collar about the chain, tensioning the chain against the collar, and severing the chain at a point on the opposite side of the collar to dispense the portion.

4,041,815

METHOD FOR PERFORATING ROOFING SHEET MATERIAL

Duane A. Davis, Plainfield, and Michael P. Krenick, Somerville, both of N.J., assignors to GAF Corporation, New York, N.Y.

Division of Ser. No. 566,765, April 10, 1975, Pat. No. 3,983,773. This application Apr. 27, 1976, Ser. No. 680,887
Int. Cl.[2] B26F *1/24*
U.S. Cl. 83—30 5 Claims



1. A method of forming perforation holes in sheet material comprising the steps of winding said sheet material into a roll, transporting said roll to a hole punching station, securely positioning said roll of sheet material at said hole punching station by applying a force thereto, simultaneously driving a plurality of punch rods axially spaced along said roll radially

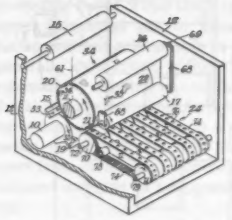
through said rolled sheet material simultaneously forming a plurality of apertures in successive wound layers of said sheet material permitting unrolling of said roll of sheet material so that said apertures will be positioned in rows and columns of the unwound sheet, and withdrawing said punch rods from said roll of sheet material substantially avoiding engagement with and tearing surrounding edges of said apertures.

4,041,816

ROTARY WEB CHOPPER

Michael Hillas Shearon, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 689,557, May 24, 1976, which is a continuation of Ser. No. 616,055, Sept. 23, 1975, abandoned.
This application Aug. 12, 1976, Ser. No. 713,807
Int. Cl.[2] B23D *25/12*; B26D *7/06*
U.S. Cl. 83—100 **20 Claims**



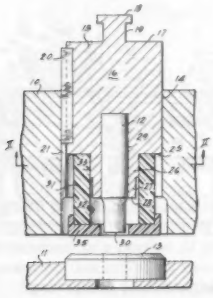
1. A cutter for a running web comprising:
first and second axially co-parallel counter-rotating shafts driven in synchronism one with the other,
a first blade mounted on said first shaft and having a straight cutting edge parallel to the axis thereof,
a second blade mounted on said second shaft and having a shaped surface defined by generatrices parallel to the axis of said second shaft with the locus of said generatrices being an epitrochoid,
said second blade having an outer peripheral surface forming with said shaped surface a second cutting edge, and
said blades co-acting along their opposed cutting edges to effect a cut on a web therebetween.

4,041,817

PUNCH HOLDER AND STRIPPER COMBINATION

Paul Chris Nelson, Lake City, Minn., assignor to Houdaille Industries, Inc., Buffalo, N.Y.

Filed Oct. 6, 1976, Ser. No. 730,089
Int. Cl.[2] B26F *1/14*
U.S. Cl. 83—139 **5 Claims**



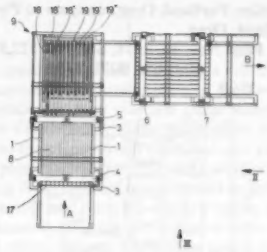
1. A punch holding device for use in punching comprising:
a punch holder having a first body section with an outer diameter dimensioned to be received in a punch holder opening in a punching machine in a relatively close fit relationship, a second body section having a reduced outer diameter smaller than the outer diameter of the first body section and coaxial therewith projecting from the first body section and terminating in an end face, a punch receiving bore in said punch holder open to the end face having a diameter less than the outer diameter of the second body section, an elastomeric stripper having an outer diameter less than the outer diameter of the first body section and an inner diameter substantially equal to the outer diameter of the second body section received on the second body section and projecting therefrom beyond the end face.

4,041,818

APPARATUS FOR CUTTING CARPET SAMPLES

Jurgen Rummer, Industriestr 8, 8602 Trosdorf, Bamberg, Germany

Continuation of Ser. No. 557,265, March 11, 1975, abandoned.
This application Apr. 26. 1976, Ser. No. 680,571
Int. Cl.[2] B26D *3/02, 7/06, 11/00*
U.S. Cl. 83—256 **15 Claims**



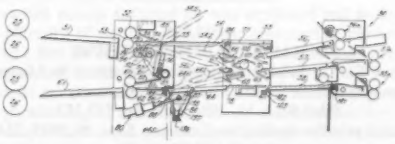
1. A device for progressively dividing carpet webs comprising a main frame; a conveying table mounted on the main frame and on which the carpet web will be supported and fed; four cutting tools, each pivotable about an axis transverse to the direction of the feed at that cutting tool, for cutting the carpet web into sample pieces and for chamfering the cut edges thereof, said cutting tools being arranged into a first pair for fashioning two opposite edges of the sample pieces and a second pair for fashioning the other two opposite edges of the sample pieces; and, between said first and second pairs of cutting tools, a straightening station for aligning carpet strips produced by the first pair of cutting tools in the direction of feed into the second pair of cutting tools.

4,041,819

LEAD-IN DEVICE FOR BI-LEVEL SLITTER

Paul Chu, Amityville; Gunther Weiskopf, New York, and Lawrence J. Saunders, Elmont, all of N.Y., assignors to S&S Corrugated Paper Machinery Co., Inc., Brooklyn, N.Y.

Filed Sept. 8, 1976, Ser. No. 721,380
Int. Cl.[2] B31B *1/16*; B26D *3/08, 11/00*
U.S. Cl. 83—302 **14 Claims**



1. Apparatus for producing sheets from a moving web including:
upper and lower slitter means for longitudinally cutting a longitudinally moving wide web into a plurality of narrower webs;

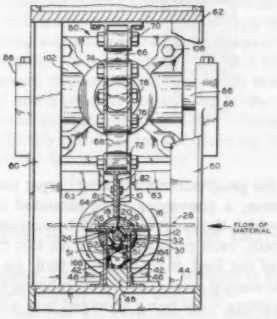
upper lead-in table means operatively positioned to support webs issuing from said upper slitter means;
lower lead-in table means operatively positioned to support webs issuing from said lower slitter means;
upper and lower cutoff means downstream of said slitter means for transversely cutting webs into sheets;
upper and lower lead-in ramp means operatively positioned upstream of the respective upper and lower cutoff means to direct webs thereto;
each of said upper and lower lead-in table means being selectively operable independently between a lower position for directing webs toward said lower ramp means, and an upper position for directing webs toward said upper ramp means;
and director-support means intermediate said lead-in table means and said lead-in ramp means for guiding and supporting webs in the region between the table means and the ramp means.

4,041,820

VENEER CLIPPER

David L. McGee, Portland, Oreg., assignor to Plymak Company, Inc., Portland, Oreg.

Filed Nov. 11, 1974, Ser. No. 522,576
Int. Cl.² B27L *5/08*
U.S. Cl. 83—356.2 **16 Claims**



1. An improved veneer clipper,
a knife,
means for reciprocating the knife,
anvil means having a cushioning portion,
support means mounting the anvil means in a position in which the cushioning portion is opposite the knife and is engaged by the knife when the knife is reciprocated,
means for shifting the cushioning portion of the anvil means laterally of the knife to change the part of the cushioning portion that is engaged by the knife,
braking means,
intermittently operable releasable means urging the anvil means against the braking means,
and means for preventing operation of the shifting means when the knife is moved toward the cushioning position.

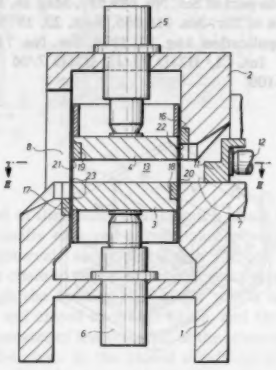
4,041,821

SCRAP SHEARING MACHINE

Hellmut Galter, Salzkotten, Germany, assignor to Lindemann Maschinenfabrik GmbH, Dusseldorf, Germany

Filed Sept. 14, 1976, Ser. No. 723,212
Claims priority, application Germany, Sept. 26, 1975, 2542909
Int. Cl.² B26D *11/00*
U.S. Cl. 83—382 **2 Claims**

1. In a scrap shearing machine for cutting up platelike scrap material, said machine comprising a first pair of knives and a second pair of knives, said first pair of knives comprising a first movable knife and a first stationary knife and said second pair of knives comprising a second movable knife and a second stationary knife, means operatively mounting said first pair of knives for cutting said scrap material in a first plane and means operatively mounting said second pair of knives for cutting said scrap in a second plane which lies at an angle to said first plane, said first pair of knives and said second pair of knives being adapted to cut said scrap material successively, the improvement comprising a housing, a first support carrying said first movable knife, means movably mounting said first support for cutting movement in said housing, a second support carrying said second movable knife, means mounting said second support for cutting movement in said housing counter to said



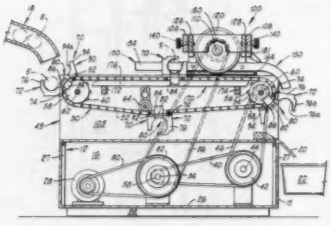
movement of said first support, means for moving said first support and said second support independently of each other, means defining an inlet opening into said housing for scrap material to be cut, means defining an outlet opening from said housing for cut pieces of said scrap material, said inlet opening being located on one side of said first plane and said outlet opening being located on the remote side of said second plane and said inlet and outlet openings being aligned with each other, and said first support and said second support forming rams which are adapted to clamp said scrap material between them during said cutting movements of said first support and said second support.

4,041,822

SAUSAGE SLICING MACHINE

Floyd S. Gabel, 5008 NW. Steanson, Oklahoma City, Okla. 73112

Filed June 11, 1976, Ser. No. 695,177
Int. Cl.² B26D *1/28*
U.S. Cl. 83—409.2 **16 Claims**



1. A sausage slicing machine comprising:
a framework;
a conveyor assembly mounted on said framework and including:
an endless chain having an upper horizontal run and a lower horizontal run; and

an articulated cradle subassembly secured to said chain and comprising:

a trailing element secured to said chain and extending transversely with respect to the direction of travel of the chain and including transversely spaced, concavely recessed roll backing plates;

a central element secured to a different part of said chain than said trailing element and movable independently of said trailing element, said central element extending transversely with respect to the direction of travel of the chain and including transversely spaced, concavely recessed roll bottoming plates; and

a leading element secured to a different part of said chain than said trailing element and central element and movable independently of said trailing element and said central element, said leading element including transversely spaced, concavely recessed roll confining plates;

said trailing, central and leading elements being responsive to the travel of said chain in a straight path in said upper horizontal run to move into a contiguous, juxtapositioned relationship to each other defining a generally cylindrical, hollow interior in the cradle subassembly adapted to contain and confine a cylindrical sausage roll, and further being responsive to movement of said chain to a semicircular path between said horizontal runs to open said elements apart from each other, whereby a sausage roll can be dropped into one of said concavely recessed plates; and

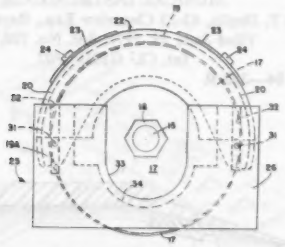
a cutter assembly supported above said framework over said conveyor assembly and including a plurality of rotatable, transversely spaced cutter blades aligned with the spaces between said transversely spaced, concavely recessed roll backing plates, and with the spaces between said roll bottoming plates and the spaces between said roll confining plates.

4,041,823

GUARD FOR SLITTING WHEEL

Walter L. Ashbrook, Fairfield, Ohio, assignor to Champion International Corporation, Stamford, Conn.

Filed Mar. 12, 1976, Ser. No. 666,437
Int. Cl.² B26D 7/22
U.S. Cl. 83—478 **11 Claims**



1. A guard for rotatable slitting wheel mounted on a base comprising:

a. an upper guard portion including a wall positioned parallel to said wheel and formed integral with two bent-over tabs for attachment to a portion of the base; and ,

b. a lower guard portion including two walls positioned on either side of said wheel, joined at their lower edges by a horizontal guard plate; said guard formed with a slot through which the edge of the slitting wheel extends;

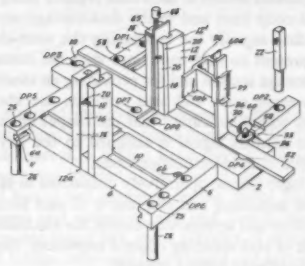
c. said lower guard portion also formed with vertical slots in one of said walls for adjustably securing the lower guard to the base.

4,041,824

LOCATION APPARATUS

Gordon Williams Wynn, 308, Northridge Way, Hemel Hempstead, Hertfordshire, England

Continuation of Ser. No. 174,423, Aug. 24, 1971, abandoned. This application June 6, 1975, Ser. No. 584,289
Int. Cl.² B27G 5/02; B27F 1/14
U.S. Cl. 83—763 **29 Claims**



1. Location apparatus for use in making a saw cut in a workpiece and comprising, in combination, a base on which the workpiece is placed, at least one saw guide member mounted on said base to define a saw blade guide plane at a predetermined setting to the plane of said base, said saw guide member comprising a pair of elements extending vertically from the base at a spacing from each other to provide an upwardly open gap for the insertion and removal of a saw blade, a side face of one of said elements forming an abutment face for the saw blade and said other element comprising means for resiliently urging the saw blade against said face while yet enabling insertion and removal of the saw blade through said upwardly open gap, a series of fixed locations being provided at spaced positions on said base, a plurality of location elements being selectively engageable with respective ones of said locations for defining a series of different and predetermined angular settings for the workpiece relative the saw guide plane permitting correspondingly oriented saw cuts to be made in said workpiece, guide means on said base extending from adjacent said at least one saw guide member transversely to said guide plane, and transverse position location means displaceably guided by said guide means for providing a location for the workpiece in said direction transverse the saw guide plane.

4,041,825

KEYBOARD ASSIGNMENT SYSTEM FOR A POLYPHONIC ELECTRONIC MUSICAL INSTRUMENT

Armand N. Pascetta, 520 Revere Drive, Turnersville, N.J. 08012

Continuation-in-part of Ser. No. 515,057, Oct. 15, 1974, abandoned, which is a continuation of Ser. No. 393,429, Aug. 31, 1973, abandoned. This application Oct. 20, 1975, Ser. No. 623,659
Int. Cl.² G10H 1/00
U.S. Cl. 84—1.01 **11 Claims**

11. A keyboard assignment system for use in an electronic musical instrument comprising:

a switch matrix actuated by said keyboard and including a plurality of switch arrays interconnected to connect one of a first set of input lines to an output line associated with each depressed switch in a priority order,

a code matrix connected to said switch matrix to produce a parallel digital code indicative of the associated key when one of the switch matrix input lines is energized,

a buffer register connected to said code matrix and enabled upon receipt of a data entry signal to provide said parallel digital code to a set of note-identification code lines,

a switch matrix sequencer for sequentially energizing said switch matrix input lines,

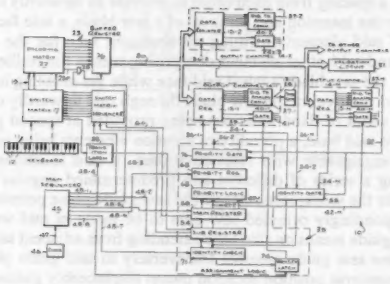
scanning control sequencer means for providing sets of

sequential control signals, some of said control signals advancing said switch matrix sequencer means to energize the next switch matrix input line, another of said control signals comprising said data entry signal,

a lesser plurality of output channels, each including a data register connect to said note-identification code lines to receive said note-identification codes therefrom, each data register having a data storage section and a comparator means,

the comparator means in each data register being connected to said code lines and to the data storage section of the same data register for comparing the note-identification code present on said code lines with the contents of that data storage section and for providing an identity signal if said present code and said contents are identical, said identity signal indicating that the output channel providing the identity signal is assigned to the key associated with that note-identification code,

priority logic means, operatively connected to said scanning control sequencer and responsive to said identity signals from all of said comparator means, for establishing, during a cycle of said scanning control sequencer, the next available unassigned output channel,



validation circuit means, connected to said code lines, for providing a "valid code" signal when a note-identification code is present on said code lines,

identity check means, operatively connected to all of said comparator means and responsive to said identity signals, for providing a "note not assigned" signal when no identity signal is provided from any of said comparator means,

priority gate means, operatively connected to said validation circuit means, to said identity check means, and to said priority logic means, for assigning a newly selected note-identification code to said next available output channel, said gate means providing a data entry signal to said next available output channel in response to simultaneous occurrence of a "valid code" signal and a "note not assigned" signal, said data entry signal causing the note selection code present on said code lines to be stored in the data storage section of the data register of said next available output channel, and

means for enabling generation of musical tones corresponding to notes identified by codes stored in said output channels.

4,041,826

ELECTRONIC MUSICAL INSTRUMENT

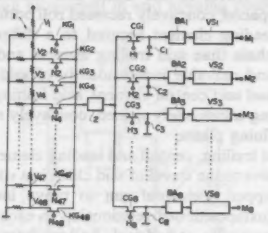
Akiyoshi Oya, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Aug. 4, 1975, Ser. No. 601,945

Claims priority, application Japan, Aug. 7, 1974, 49-90515; Aug. 12, 1974, 49-92172; Aug. 14, 1974, 49-93660

Int. Cl.[2] G10H *1/00*

U.S. Cl. 84—1.01 **5 Claims**



1. An electronic musical instrument comprising:

a voltage circuit for producing a plurality of d-c note voltages corresponding to respective keys;

a plurality of key gate circuits connected at inputs thereof to the outputs of said voltage circuit and connected at outputs thereof in common connection;

a key gate control signal generator for generating a key gate control signal used for enabling, in response to depression of a key, one of said key gate circuits corresponding to the depressed key;

a plurality of channel gate circuits connected to the common output terminal of said key gate circuits;

channel gate signal generation means for producing, in time-shared sequence, channel gate signals used for enabling said channel gate circuits;

storage means for separately storing each of the d-c note voltages supplied from said channel gate circuits; and

a plurality of musical tone generation systems for producing musical tone signals corresponding to the stored d-c note voltages.

4,041,827

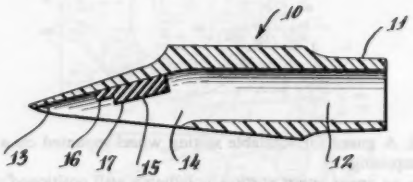
TONE ENHANCING DEVICE FOR REED TYPE MUSICAL INSTRUMENTS

Nicholas T. Daglis, 42-23 Clearview Exp., Bayside, N.Y. 11361

Filed June 29, 1976, Ser. No. 700,796

Int. Cl.[2] G10D *9/02*

U.S. Cl. 84—383 R **5 Claims**



1. A tone enhancing element for incorporation in the mouthpiece of a reed type musical instrument, said mouthpiece having an air flow-through passage opening through the end of the mouthpiece to which a player applies his mouth to play the instrument, said end being generally V-shaped with said opening and its adjacent edge portions being shaped for a reed to be mounted over the opening, said element comprising:

two successive, substantially well defined steps adapted to

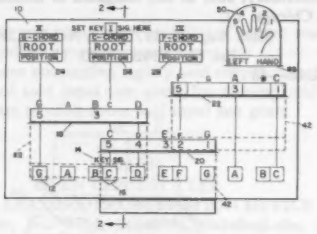
be positioned to project into said passage from the interior wall thereof opposite said opening, with the first of said steps in from said end of the mouthpiece being lower than the second so that the second step projects further into said passage than the first.

4,041,828

CHORD FINGERING COORDINATOR

Verna M. Leonard, 8701 Highway 41, Fresno, Calif. 93710

Filed Feb. 6, 1976, Ser. No. 655,702
Int. Cl.² G09B *15/02*
U.S. Cl. 84—471 R **8 Claims**



1. A multiple chord and scale integrator compising:

a. a backing sheet having displayed thereon the consecutive scale tones of a diatonic scale;

b. said backing sheet having a plurality of vertically staggered and horizontally overlapping mounting means; and

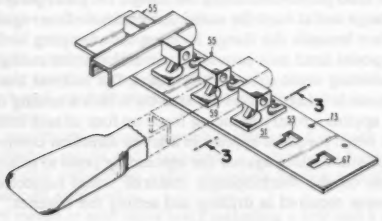
c. a plurality of panels removably mounted in said mounting means, each of said panels having indicia thereon to register with selected ones of said scale tones of said diatonic scale to indicate a particular chord or scale to be played from said diatonic scale.

4,041,829

PIANO PEDAL ASSEMBLY

Robert Ogden Robeson, Boiceville, N.Y. 12412, and Vincent Joseph Hart, 4 Smith Ave., Kingston, N.Y. 12401

Filed Sept. 30, 1975, Ser. No. 618,054
Int. Cl.² G10C *3/26*
U.S. Cl. 84—225 **10 Claims**



1. A piano pedal assembly comprising in combination

a plurality of pedals,

a support member having a plurality of openings therein,

a plurality of mounting blocks having notched portions adapted to fit within said openings, a pair of said mounting blocks being used to support each of said pedals,

means for coupling said pedals to said mounting blocks, and

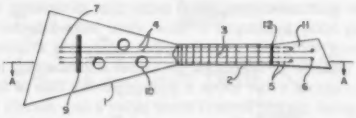
means for attaching said mounting blocks to said support member to provide registration and alignment of said pedals in said piano pedal assembly.

4,041,830

TEACHING UKELELE

J. Chalmers Doane, 31 Bridgeview Drive, Halifax, Nova Scotia, Canada

Filed Sept. 18, 1975, Ser. No. 614,373
Int. Cl.² G10D *3/14*
U.S. Cl. 84—305 **6 Claims**



1. In a stringed musical instrument of the type having a hollow sound box, a neck having a fingerboard mounted on the top surface thereof, a tuning head having tuning pegs, said tuning head being located at the end of said neck remote for said sound box, a nut mounted on the upper surface of said neck between said soundbox and said tuning head, a bridge mounted on said sound box, and a plurality of strings extending across said bridge, over said fingerboard and across said nut to said tuning pegs and attached thereto, the improvement comprising:

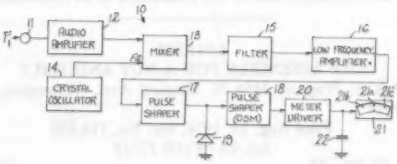
said tuning head having a pair of holes for each string penetrating through said tuning head between said nut and said tuning pegs for receiving said string at the upper surface of said tuning head and passing it to the lower surface thereof and for receiving said string at the lower surface of said tuning head and passing it to said upper surface.

4,041,831

INSTRUMENT FOR TUNING MUSICAL INSTRUMENTS

Ronald G. Arpino, 24 Damien Road, Branford, Conn. 06405

Filed July 8, 1975, Ser. No. 594,114
Int. Cl.² G10G *7/02*
U.S. Cl. 84—454 **14 Claims**



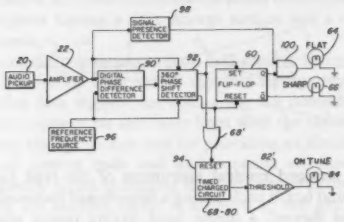
1. An instrument for indicating when an audio frequency signal such as a tuned frequency of a musical instrument is achieved comprising audio-receiving means adapted to receive an audio frequency signal, a local oscillator having a signal whose frequency differs by a small amount from the tuned frequency, a mixer for mixing the received audio frequency signal and the local oscillator signal to provide a difference frequency therebetween, filtering means, said filtering means having a pass range selected to pass a narrow frequency range including said difference frequency and exclude other frequency outputs of said mixer, said filter receiving the output of said mixer, pulse-shaping means responsive to the output of said filter for converting the difference frequency signal to a series of pulses of predetermined height and width of the same frequency as said difference frequency, an indicating meter, and means for applying said pulses to said indicating meter, said meter being calibrated to indicate the frequency of said pulses, whereby the meter may indicate when the difference frequency is a predetermined value.

4,041,832

TUNING AIDS

Douglas M. Risch, 816 E. 58th St., Loveland, Colo. 80537

Filed Nov. 25, 1975, Ser. No. 635,372
Int. Cl.² G10G 7/02
U.S. Cl. 84—454 **5 Claims**



1. A tuning aid comprising:

a stable source of reference signal having a selectable frequency to produce a given digital tone signal;

means for sensing a note developed by an instrument and developing a corresponding digital measurement signal;

means for comparing said tone and measurement signals to produce indicating signals representing respectively the one present of the conditions of sharp, flat or on-tune of said measurement signal relative to said tone signal, said comparing means having a phase difference detector responsive to said tone and measurement signals for producing a difference signal and a single phase shift detector responsive to said tone and measurement signals and also to said difference signal for producing a first indication signal representing said sharp condition, a second indication signal representing said flat condition and a combination of said first and second signals representing said on-tune condition;

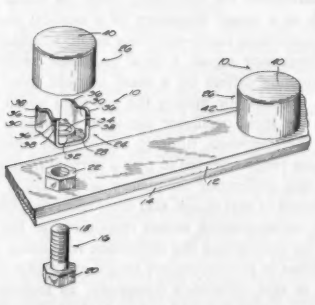
and means responsive to said indicating signals for displaying the respective one of said conditions indicated, said responsive means including first, second and third display elements individually energized in response to respective different ones of said indicating signals and each displaying a single, fixed, stationary and continuous indication of the respective one of the conditions to be indicated.

4,041,833

CAP ASSEMBLY FOR A NUT AND BOLT

Adolph A. Wagner, 3454 N. Shepard Ave., Milwaukee, Wis. 53211

Filed Aug. 13, 1976, Ser. No. 714,031
Int. Cl.² F16B 37/14
U.S. Cl. 85—35 **9 Claims**



1. A cap assembly for a bolt having a head and a threaded shank with a nut threaded on the threaded shank comprising:

a retainer member of substantially U-shape having a base portion and a pair of legs extending therefrom, each of said legs having a pair of relatively sharp vertical edges thereon, said base portion having a threaded opening therein to facilitate threaded engagement between said retainer member and the threaded shank of said bolt; and

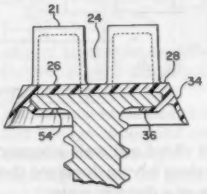
a cap member having a top portion and a wall portion integral therewith, said wall portion dimensioned so that when said cap member is fitted over the legs of said retainer member, the sharp edges of said legs will be in tight frictional engagement with the inside surface of said wall portion of said cap member.

4,041,834

PLASTIC HEADED FASTENER ASSEMBLY

Daniel Joseph Herkes, Aurora, and Ernest William Reinwall, Jr., McHenry, both of Ill., assignors to Illinois Tool Works Inc., Chicago, Ill.

Filed Aug. 24, 1976, Ser. No. 717,295
Int. Cl.² F16B 23/00, 35/06
U.S. Cl. 85—45 **4 Claims**



1. A threaded fastener with a composite, corrosive resistant head, including a metal body with a threaded shank and an integral radially enlarged head portion at one extremity and a drill point at the other extremity, a pair of slots formed in the head portion intersecting at right angles at their midpoints and at the axis of the threaded shank, the slots extending transversely of the head intersecting the outer periphery thereof, a flange extending radially outwardly of the head the bottommost surface thereof forming the clamping surface of the head portion, the slots defining four upstanding posts, each post thereby including a pair of internal, intersecting planar surfaces extending substantially perpendicular to the base of the slots and to each other, the base of the slots being coplanar and substantially perpendicular to the longitudinal axis of the fastener, a thin-walled, substantially uniform thickness of corrosive resistant thermoplastic coating covering all surfaces of the enlarged head portion including the flange, the outer periphery of the flange and at least the radial outermost surface region of the surface beneath the flange forming the clamping surface, the composite head thus providing a cruciform slot configuration presenting eight substantially equal, flat internal bearing surfaces maximizing the surface area on which a mating driving tool applies a rotary inducing force on four of said internal surfaces when torque is applied in a given direction compressing the plastic coating against the upstanding posts to minimize the stress on the thermoplastic material when subjected to large torque required in drilling and setting the fastener.

4,041,835

TORQUE TRANSMITTING APPARATUS

Ernst R. Isler, Zurich, Switzerland, assignor to Helena A. M. Isler, Zurich, Switzerland

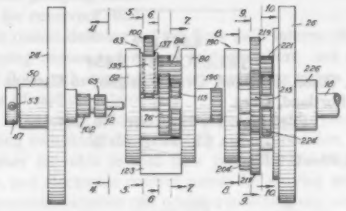
Filed Dec. 18, 1975, Ser. No. 642,209
Int. Cl.² F16H 3/74
U.S. Cl. 74—751 **11 Claims**

1. An apparatus for transmitting torque from a prime mover to a load, comprising:

an input planetary gear unit adapted to be connected drivingly to the output of the prime mover, said input unit

including a plurality of input sun gears and a plurality of input planet gears;

an output planetary gear unit coupled to said input unit and adapted to be connected drivingly to the input of the load,



said output unit including a plurality of output sun gears and a plurality of output planet gears; and

reaction means connecting rigidly said output planet gears and one of said input sun gears for causing said input planet gears to orbit about said input sun gears.

4,041,836

OPEN CIRCUIT TYPE ACCELERATION/DECELERATION DEVICE

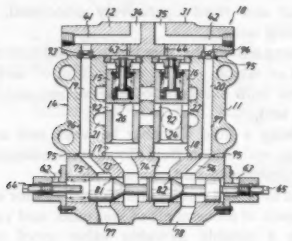
Hikaru Murata, No. 1734, Sakakura, Sakahogi-cho, Kamo, Gifu, Japan

Filed May 7, 1975, Ser. No. 575,261

Claims priority, application Japan, May 8, 1974, 49-51004; May 8, 1974, 49-51005

Int. Cl.[2] F15B *13/043*

U.S. Cl. 91—29 **7 Claims**



1. An acceleration/deceleration system of the open-circuit type, comprising

a fluid motor having two motor ports;

a fluid pressure source;

a fluid reservoir;

supply conduit means connecting said source to said motor;

discharge conduit means connecting said motor to said reservoir;

an amplification vavle assembly interposed in both of said conduit means and comprising a valve body having two parallel cylindrical valve chambers having a first and a second axial end;

port means in said valve body including a first and a second external port respectively communicating with said source and said reservoir as well as with the respective chambers;

a plurality of internal ports in said valve body intercommunicating said chambers;

third and fourth external ports in said valve body each communicating said axial axial end of each of said chambers with a respective one of said motor ports;

hollow fluid pressure responsive first supply and exhaust valve spools axially slidable in the respective chambers relative to said internal ports between a neutral position in which they block the fluid flow through said chambers and an operating position in which they permit supply and exhaust fluid flow therethrough;

a pair of pilot flow passages in said valve body each having one end communicating with said first end of one of said chambers and also having another end connected with a respective external port;

a limiting orifice member interposed in each of said pilot flow passages;

a valve passage in said valve body interconnecting each of said second axial ends with a respective pilot passage adjacent a respective external port; and pilot generated spool valve means including spool valves slidably interposed in said valve passage, a spool valve means control pilot circuit, and a valve spool control circuit, being operative for supplying fluid to a respective pilot flow passage and to the first end of a respective chamber to act on the respective pressure responsive valve spool for controlling the displacement of said valve spools in said chambers in dependence upon a pressure drop occurring between fluid flows passing said limiting orifice members in said pilot flow passages.

4,041,837

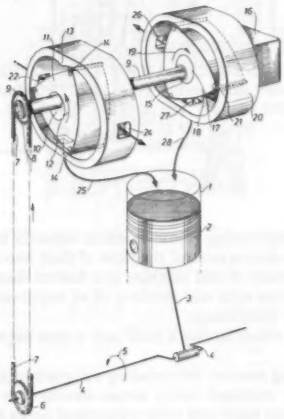
INDUCTION AND EXHAUST APPARATUS FOR PISTON MACHINES

Franz Weidlich, Snapphanevagen 150, 175 34 Jarfalla, Sweden

Filed Mar. 5, 1976, Ser. No. 664,186

Int. Cl.[2] F01L *33/02*; F15B *13/04*

U.S. Cl. 91—270 **7 Claims**



1. In combination with a cylinder of a four-stroke piston engine, the cylinder having a reciprocating working piston defining a working chamber therewith and a drive shaft connected to the piston: a device for sequentially controlling an intake, compression, power and exhaust stroke of the piston, the device comprising

a. a first and a second rotary valve means, each of the valve means including

1. a housing with an epitrochoidal shaped cavity having ports and

2. a triangularly shaped rotor supported in said cavity or epitrochoidal movement, the rotor having three surfaces defining respective chambers with the housing,

3. the ports in the housing of the first rotary valve means including an intake and an exhaust port, the ports in the housing of the second rotary valve means including an exhaust port, and an additional one of the ports in each of the housings serving for connection of one of the chambers to the working chamber of the cylinder,

b. duct means connecting the additional ports to the working chamber, and

c. synchronizing means connecting the drive shaft and the rotors for synchronizing the rotation of the drive shaft with that of the rotors, the synchronizing means including

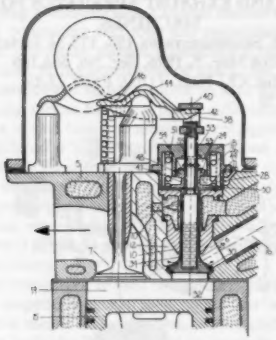
1. reduction gearing causing the rotors to move so that, for each complete stroke, the one chamber in the housings is in communication with the working chamber of the cylinder through the duct means, the intake and the exhaust ports in the housing of the first valve means are selectively in and out of communication with the one chamber, the exhaust port in the housing of the second valve means is selectively in and out of communication with the one chamber, and such a surface of the rotors is exposed to gases coming from the working chamber of the cylinder during the power stroke that the gases contribute to the rotary movement of the rotors.

4,041,838

VALVE ARRANGEMENTS FOR RECIPROCATING PISTON MACHINES

Glenn B. Warren, 1361 Myron St., Schenectady, N.Y. 12309

Filed Nov. 17, 1975, Ser. No. 632,316
Int. Cl.² F01L *15/16*
U.S. Cl. 91—273 **11 Claims**



1. In a reciprocating piston machine wherein inlet and discharge valve means control the flow of fluid into and out of a working cylinder of said machine in a desired timed sequence, the combination with said machine of an improved inlet valve arrangement comprising:

a. an inlet valve having a head and a stem extending therefrom;

b. a housing member surrounding a portion of said stem and defining enclosed cavity means having first and second concentric inner and outer cylindrical bores adjacent said cylinder;

c. plunger means carried by said valve stem and within said enclosed housing means, said plunger means including a first portion disposed in sealed working relationship with the inner smaller diameter one of said cylindrical bores to define a sealed gas containing space above said first portion and a second portion within and near the bottom of said enclosed housing means, said second portion having a diameter smaller than the inside diameter of said outer larger diameter one of said cylindrical bores to define a small annular passage therewith;

d. a valve spring disposed within said larger diameter cylindrical bore and arranged therein and with said second portion of said plunger means to urge said valve to its closed position; and

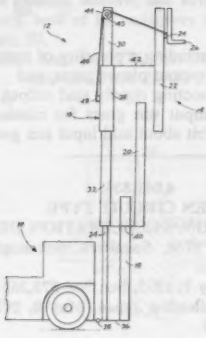
e. valve actuating means including a rotary cam means driven in timed relationship with said machine and a pivotally mounted rocker arm means operatively associated with said cam means and with said inlet valve for actuating said inlet valve to its open position at the desired time in a direction away from said cylinder against the combined resistances of said valve closing spring and the gas compressed in said gas containing space by said first portion of said plunger means and for releasing said valve to be actuated to its closed position at the desired time by the combined forces of said valve spring and said compressed gas.

4,041,839

TELESCOPIC RAM

John E. Olson, Portland, Oreg., assignor to Cascade Corporation, Portland, Oreg.

Filed Nov. 24, 1975, Ser. No. 634,422
Int. Cl.² F01B *15/02*
U.S. Cl. 91—189 R **6 Claims**



1. A fluid-actuated extensible-contractible device comprising

first, second and third operatively associated, relatively reciprocable units,

means defining a fluid chamber between said first and second units out of which, due to contraction of said chamber, fluid flows with extension of said second unit relative to said first unit,

means defining a fluid chamber between said second and third units into which fluid flows with extension of said first unit relative to said second unit, and

valve means mounted within said second unit for controlling the sequence of movements of said units, said valve means including a slidably movable valve spool operatively associated with said chambers, and operable, as a result of extension of said second unit relative to said first unit, to shift from one position allowing the escape of fluid from said first-mentioned chamber toward another position blocking such escape and capturing fluid in said two chambers, whereby to effect the transfer of fluid from said first-mentioned chamber to said second-mentioned chamber during extension of said second unit relative to said first unit to cause, as a result of such transfer alone, simultaneous extension of said third unit relative to said second unit.

4,041,840

CONTROL SYSTEM

Wilhelm Zirps, Hemmingen, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Dec. 18, 1975, Ser. No. 641,914
Claims priority, application Germany, Dec. 31, 1974, 2461896
Int. Cl.² F15B *13/042, 15/17*
U.S. Cl. 91—416 **15 Claims**

1. In a follow-up control system, a combination comprising:

A. means for changing the position of a movable element during operation of the control system, including

a hydraulic cylinder having an interior for accommodating fluid;

a piston mounted for movement relative to said cylinder,

said piston having a leading portion which divides the interior of said cylinder into a first and a second chamber, and a trailing portion adapted to be coupled to the element to be moved;

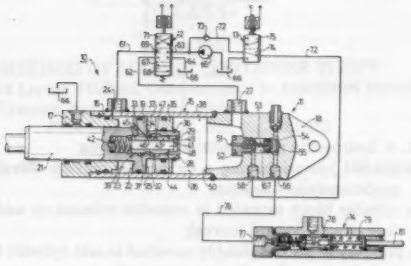
means for pumping fluid;

means for receiving fluid;

conduit means defining a fluid flow path intermediate said pumping means and one of said chambers, and another fluid flow path intermediate said receiving means and the other of said chambers; and

means for moving said piston relative to said cylinder, including switching means having a multi-position valving member movable in said flow paths for directing fluid flow, and electronic control means for moving said valving member between one position in which said chambers are respectively connected to said pumping means and said receiving means for moving said piston in one direction, and another position in which said chambers are respectively oppositely connected to said pumping means and said receiving means for moving said piston in an opposite direction; and

B. safety override means for adjusting the position of the movable element in the event of malfunction of said electronic control means, including



means associated with said piston for subdividing said second chamber into a first and a second compartment said first compartment being defined in part by said piston;

valve means having a valve element mounted on said piston for movement relative thereto between a first position in which said compartments are in communication with each other, and a second position in which said first chamber communicates with said first compartment;

a pressure-responsive movable member having a contact side facing said valve element, and an opposite side;

means for biasing said valving member of said switching means in the event of malfunction of said electronic control means to said one position in which said piston is moved in said one direction until said valve element mounted thereon overlies said contact side; and

actuating means at said opposite side of said pressure-responsive member for moving said contact side of the latter into force-transmitting engagement with said valve element so as to move the latter from said first position towards said second position in which fluid from said first chamber enters said first compartment so as to move said piston in direction opposite to said one direction, whereby the position of the movable element is adjusted despite failure of said electronic control means.

4,041,841

METHODS OF AND APPARATUS FOR CONTROLLING HYDRAULIC EQUIPMENT

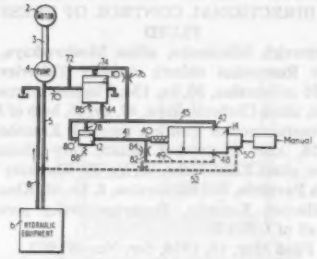
Francis Anthony Haskew, Burton-on-Trent, England, assignor to Coal Industry (Patents) Ltd., London, England

Filed Feb. 13, 1976, Ser. No. 657,878

Claims priority, application United Kingdom, Feb. 14, 1975, 06338/75

Int. Cl.[2] G05D *16/00*; F15B *11/08*

U.S. Cl. 91—421 **11 Claims**



1. A method of controlling hydraulic equipment including a pressure fluid feed and a pressure fluid return, comprising sensing the pressure fluid in the return to control exhausting of the pressure fluid in the feed such that a sensed preselected fall in the return pressure exhausts the pressure fluid in the feed.

4,041,842

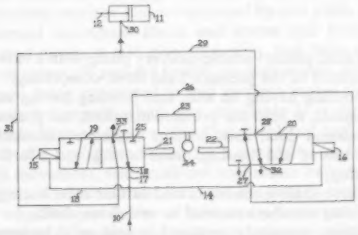
DUAL-SOLENOID SAFETY VALVE

Barry A. Stunkel, 1170 W. Fork Drive, Lake Forest, Ill. 60045

Filed July 25, 1975, Ser. No. 599,188

Int. Cl.[2] F15B *11/08, 13/04*

U.S. Cl. 91—448 **6 Claims**



1. A dual-solenoid operated safety valve system for controlling the source of operating pneumatic pressure to a machine including a piston having reciprocal motion, comprising

a. a pair of control valves interposed between the source of operating pneumatic pressure and the piston of the machine, with each valve having an inoperative position wherein the pneumatic pressure is prevented from being admitted to and operating the piston of the machine,

b. electrically operated solenoid means for each of said control valves for independently operating the same so as to change said valves from their normal inoperative position to an operative position when said solenoid means are energized,

c. means connecting said control valves in series when moved into their operative position by said solenoid means so as to connect the source of operating pneumatic pressure through each of said control valves to the piston of the machine,

d. means connecting said control valves in parallel with the piston of the machine so as to exhaust pneumatic pressure

therefrom when either or both valves are in their inoperative position, and

e. switch means interposed between said control valves and operable by means provided by each of said control valves for electrically sensing when either of said valves remains in its operative position after said solenoid means are deenergized and for preventing reactivation of either of said control valves.

4,041,843

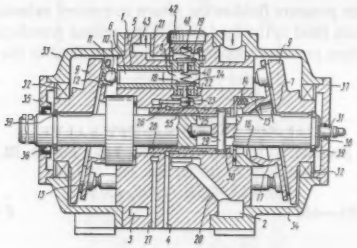
AXIAL-PISTON VARIABLE-DELIVERY PUMP WITH VALVE DIRECTIONAL CONTROL OF PRESSURE FLUID

Vladimir Petrovich Mischenko, ulitsa Moskovskaya, 76, kv. 166, Azov Rostovskoi oblasti; Anatoly Yakovlevich Oxenenko, 601 mikroraion, 30, kv. 134; Vladimir Alexandrovich Mischenko, ulitsa Chebotarskaya, 47, kv. 15, both of Kharkov; Georgy Konstantinovich Vasiliev, pereulok Krasnoarmeisky, 105, kv. 16, Azov Rostovskoi oblasti; Jury Alexandrovich Gavrilenko, ulitsa Kibalchicha, 25, kv. 59, Kharkov; Vladimir Vasilievich Povelitsa, 605 mikroraion, 6, kv. 41, Kharkov, and Ivan Vasilievich Kosenko, Dnepropetrovsky pereulok, 9, Kharkov, all of U.S.S.R.

Filed Mar. 15, 1976, Ser. No. 667,072

Int. Cl.² F01B *3/02*

U.S. Cl. 91—499 **7 Claims**



1. An axial-piston variable-delivery pump with a valve directional control of the pressure fluid flow, comprising:

a. a housing having an axis, said housing having an intake manifold, at least one pressure manifold, one pressure fluid admission duct, axial borings spaced equidistantly from the axis of said housing, radial borings and a further axial boring;

b. a drive shaft mounted in said further axial boring;

c. driving members secured to said drive shaft;

d. pistons oppositely arranged in said axial borings of the housing, said pistons being free to reciprocate in said borings, and to coact with said driving members and establish pump delivery chambers in said axial borings;

e. delivery valves to provide communication between said pump delivery chambers and said pressure manifold;

f. inlet valves to provide communication between said pump delivery chambers and said intake manifold;

g. actuator spindles for said inlet valves;

h. a cylindrical sleeve slidably mounted in said further axial boring of the housing, said sleeve embracing said drive shaft and being interconnected therewith so as to rotate cooperatively therewith, said cylindrical sleeve having an outer surface provided with a number of depressions and lands which bound said depressions to define individual zones, one of said zones being in constant communication with an exhaust line, while another of said zones is in communication with said pressure fluid admission duct; said depressions and lands forming a shaped surface on said cylindrical sleeve;

i. a plurality of first plungers each of which is accommodated in one of said radial borings in the housing coaxially with said inlet valve to cooperate with said actuator spindle of said inlet valve and establish, together with said radial boring of said housing, a chamber in said housing in communication with said shaped surface of the cylindrical sleeve;

j. at least one further plunger accommodated in at least one of said chambers coaxially with said first plunger to interact therewith; said housing having at least one further duct to admit pressure fluid to the zone of interaction of said plunger.

4,041,844

HYDROSTATIC PISTON MACHINE

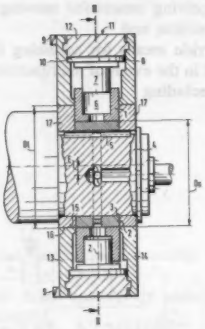
Anton Steiger, Illnau, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed June 9, 1975, Ser. No. 584,943

Claims priority, application Switzerland, June 12, 1974, 8019/74

Int. Cl.² F01B *13/06*

U.S. Cl. 92—58 **7 Claims**



1. A hydrostatic piston machine comprising

a control journal having a cylindrical surface thereon of predetermined diameter;

a cylinder block mounted in rotatable relation on said surface of said control journal;

a plurality of pistons slidably mounted in said cylinder block radially thereof;

a pair of trunnions on said control journal, each said trunnion having an outer cylindrical bearing surface thereon of a diameter greater than said predetermined diameter and equal to each other; and

guide means for reciprocating said pistons in said cylinder block, said guide means being rotatably mounted on said bearing surfaces of said trunnions in rotatable relation to said control journal eccentrically of said cylinder block.

4,041,845

HYDRAULIC ELEVATOR APPARATUS

Jean-Marie L. Mean; Joseph K. Kraft, both of Gettysburg, and Leigh F. Jackson, Fayetteville, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 20, 1975, Ser. No. 633,999

Int. Cl.² F01B *11/02*; B66B *11/04*

U.S. Cl. 92—85 A **12 Claims**

1. Elevator apparatus, comprising:

an elevator car,

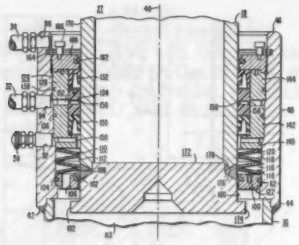
a jack including a cylinder having a main fluid chamber and a fluid actuated plunger which supports said elevator car,

said cylinder including a cylinder head having limit means for cooperating with the plunger to stop the plunger at a predetermined travel limit,

said limit means including a first end member having fluid openings therein, and resilient means, said first end member and said resilient means cooperating to provide an

auxiliary fluid chamber in fluid communication with said main fluid chamber,

said plunger stressing said resilient means as it nears said predetermined travel limit to reduce the volume of said auxiliary fluid chamber and force fluid therefrom into said main chamber via the fluid openings in said first end member,



said resilient means reducing the degree of fluid communication between said auxiliary and main fluid chambers as it is stressed to provide a hydraulic retarding force which cooperates with the resilient retarding force of the resilient means to smoothly decelerate and stop the plunger with reduced impact forces on said cylinder head.

4,041,846

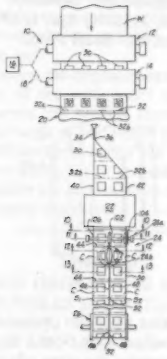
METHOD OF MAKING CONTAINER STRIPS

Bernard Lerner, Hudson, Ohio, assignor to Automated Packaging Systems, Inc., Twinsburg, Ohio

Filed Sept. 11, 1975, Ser. No. 612,462

Int. Cl.² B31B *1/64*

U.S. Cl. 93—35 PC **15 Claims**



11. The method of joining strips of open but separable containers together to register the containers of joined strips comprising:

a. heat softening edges of the container strips;

b. maintaining the strips separated until an integral, partially cooled, bead is formed on each strip, and,

c. thereafter bringingthe beads together while still sufficiently warm to be in a tacky state and thereby forming bridges between the strips.

4,041,847

APPARATUS FOR SEPARATING PUNCHED-OUT WORKPIECES FROM THE SURROUNDING WASTE MATERIAL

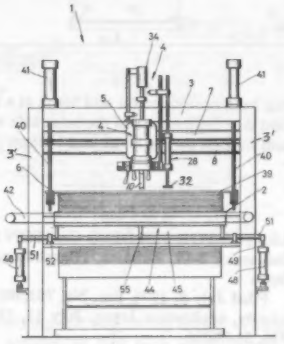
Ernst M. Spengler, Heusenstamm, Germany, assignor to Stanztechnik GmbH Roeder & Spengler, Bergen-Enkleim, Germany

Filed June 16, 1975, Ser. No. 586,896

Claims priority, application Germany, June 21, 1974, 2429903; Jan. 23, 1975, 2502543

Int. Cl.² B26D *7/18*

U.S. Cl. 93—36 A **17 Claims**



1. An apparatus for separating stacked and punched workpieces of flat material from waste material surrounding the workpieces along cut lines interrupted by bridges after a punching operation, comprising a frame structure, horizontal table support means for said stacked and punched workpieces of flat material in said frame structure, guide means secured to said frame structure above said horizontal table support means, said guide means extending across said horizontal table in a given direction, carriage means supported by said guide means for horizontal movement above and across said horizontal table support means in said given direction, tool drive means, adjustment means (9) secured to said carriage means, said tool drive means being connected to said carriage means through said adjustment means which are adjustable in a direction perpendicularly to said given direction, break-out tool means secured to said tool drive means for a controlled vertical up and down movement, said break-out tool means having a free end for controlled movement into said cut lines to break said bridges, whereby movement of said carriage means in said given direction in combination with movement of said adjustment means in the direction perpendicularly to said given direction permits positioning said tool means in unison in a rectangular coordinate system.

4,041,848

METHOD OF MAKING CONTAINER

Frank P. Richards, Kansas City, Mo., assignor to Phillips Petroleum Company, Bartlesville, Okla.

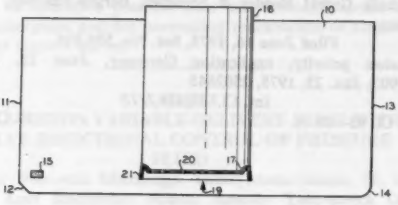
Division of Ser. No. 511,271, Oct. 2, 1974, Pat. No. 3,944,126. This application Dec. 15, 1975, Ser. No. 640,592

Int. Cl.² B31B *49/02*

U.S. Cl. 93—36.5 R **6 Claims**

1. The method of constructing a container from a geneally rectangular blank of paperboard or the like and a bottom closure member in the form of a generally circular disc having a depending skirt, which method comprises: positioning a bead of sealant on the blank near one corner thereof; forming the blank having the bead of sealant thereon into a cylindrical or conical side wall by lapping the side edge of the blank adjacent the bead of sealant over the other side edge so that the bead of sealant is on the inner side of the side wall at the resulting inner

seam, and positioning the bottom closure member in the end of the side wall adjacent the bead of sealant; and sealing the side edges of the blank and crimping the bottom edge of the blank to the depending skirt to form the container, said bead of



sealant having been positioned on said blank at a location such that the sealant is at the junction of the inner side wall seam and the inner seam formed by the blank and bottom closure member.

4,041,849

APPARATUS FOR FOLDING CARTON SHEET

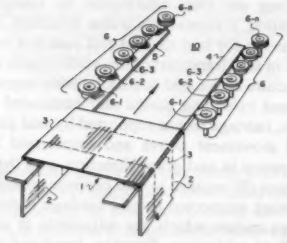
Yasuhiro Tsukasaki, 2-19, 4-chome, Higashikagaya, Suminoe, Osaka, Japan

Filed July 8, 1976, Ser. No. 703,590

Claims priority, application Japan, July 11, 1975, 50-85653; Mar. 26, 1976, 51-34016

Int. Cl.[2] B31B *1/56*

U.S. Cl. 93—52 **6 Claims**



1. A device for folding at least one side flap of a container blank having a central panel and at least one side flap hinged to said central panel, comprising a guide rail over which said blank is movable having an edge positionable at the hinged connection of said panel to said side flap, a plurality of guide rollers arranged along one side of said guide rail each having a top flange overlying said rail and engageable over said central panel and a bottom flange disposed in spaced vertical relation to and extending inwardly at an angle to said top flange portions, the angle of said bottom flanges of respective adjacent rollers decreasing in the direction of movement of said blank and progressively engageable with said flap to fold it upwardly against said panel as said blank is moved along said rail.

4,041,850

METHOD OF ERECTING CARTON BLANKS

Donald G. Reichert, Tarpon Springs, Fla., assignor to ABC Packaging Machine Corporation, Tarpon Springs, Fla.

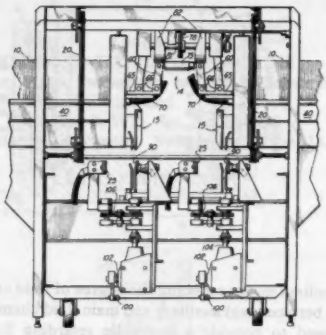
Division of Ser. No. 496,028, Aug. 9, 1974, Pat. No. 3,952,636. This application Jan. 21, 1976, Ser. No. 650,949

Int. Cl.[2] B31B *1/80*

U.S. Cl. 93—53 M **3 Claims**

1. A method of erecting cases stored in upright flattened positions in a pair of opposed magazines, said method including the steps of:

a. simultaneously gripping an end member flattened case in each magazine by suction means;
b. positioning each extracted flattened case over a drop chute;
c. releasing each flattened case from each of said suction means to allow each case to drop into each drop chute;
d. urging the flattened cases in a generally horizontal direction out of said drop chute;



e. opening the flattened cases by spreading the case sides apart;
f. tucking in lower case end flaps;
g. folding one case bottom panel in under the tucked end flaps;
h. applying adhesive to the folded bottom panel;
i. folding another bottom panel in under the bottom panel having adhesive thereon; and
j. compressing the two bottom panels together.

4,041,851

METHOD FOR MAKING PLASTIC BAGS

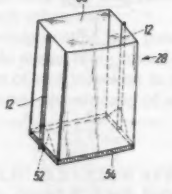
Hans G. Jentsch, Daimler Strasse 4, 43 Essen, Germany

Division of Ser. No. 151,320, June 9, 1971, abandoned. This application May 18, 1973, Ser. No. 361,665

Claims priority, application Germany, June 11, 1970, 2028693; Mar. 30, 1971, 2115350; Apr. 1, 1971, 7112470

Int. Cl.[2] B31B *31/60*

U.S. Cl. 93—35 SB **10 Claims**



1. A method of making a plastics container having a bottom wall in a W-shaped configuration from a single sheet or film of plastics material, comprising the steps of:

a. folding a laminated sheet or film blank having at least one layer of weldable plastics material upon itself to provide two superjacently disposed blank sections in a U-shaped configuration;
b. forming a tuck at the base of said U-shaped portion to impart a W-shaped configuration thereto to enable formation of said bottom wall;
c. welding the bottom creases resulting from said W-shaped folding to form weld seams defining in part said bottom;
d. forming longitudinal weld seams of said blank sections by applying first welding jaws at both exterior sides of the superjacent portions along each longitudinal seam, leav-

ing a sealable opening formed by the upper edges of said container blank sections; and after cutting

e. overwelding the longitudinal weld seams at the outer edges thereof by applying further welding jaws at both exterior sides of said weld seams so that the layers of weldable plastics material are melted together thereby completely sealing the container relative to the exterior.

4,041,852

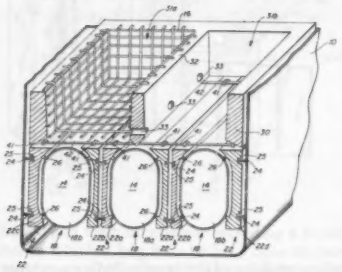
DEEP FAT FRYER FAT SAVER

Richard T. Keating, 715 S. 25th Ave., Oak Park, Ill. 60104

Continuation of Ser. No. 626,711, Oct. 29, 1975, abandoned. This application July 2, 1976, Ser. No. 702,355

Int. Cl.² A47J *37/12*

U.S. Cl. 99—403 **5 Claims**



1. In an open-top vessel containing fat for deep fat frying having a heating portion wherein heat exchanger tubes with convex outer walls on each side thereof are mounted in spaced relation with respect to each other and with respect to the walls of the said vessel and a frying portion wherein food-containing baskets inserted therein are suspended above said heating portion, the fat in said vessel at least filling said heating portion, the improvement comprising:

a. Removable first fat-displacement means inserted in the heating portion of the said vessel through the open top thereof inbetween the heat exchanger tubes therein and between said tubes and the walls of said vessel parallel therewith, means supporting said first fat-displacement means in spaced relation with the walls of said heat exchanger tubes; and

b. Removable second fat-displacement means inserted in the frying portion of the said vessel through the open top thereof inbetween the baskets therein and between said baskets and the walls of said vessel to raise the level of the fat therein sufficiently to cover the food in said baskets;

whereby the non-working fat in the said vessel is minimized and all surfaces therein are accessible to conventional cleaning tools through the open top thereof.

4,041,853

APPARATUS FOR ORGANIZING AND ARRANGING BUNDLES INTO STACKS

William G. A. Verwey, Phoenix, and Stephen Stanton, Baltimore, both of Md., assignors to Precision Industries, Inc., Baltimore, Md.

Filed Nov. 17, 1975, Ser. No. 632,583

Int. Cl.² B65B *13/18*

U.S. Cl. 100—4 **20 Claims**

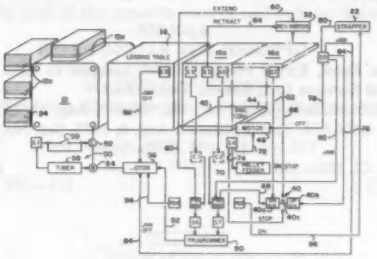
1. Apparatus for organizing and arranging bundles into stacks, comprising:

means responsive to a first control signal for supplying bundles to a loading station, said supplying means including a conveyor having support members which remain horizontally disposed while transferring a bundle to said loading station;

means for receiving and supporting bundles from said loading station to form a layer of bundles, said receiving and supporting means being responsive to a second control signal to move between a retracted and an extended position;

stack-forming means mounted below said receiving and supporting means for receiving layers from said receiving and supporting means when said receiving and supporting means is retracted to form a stack of bundles from said layers, said stack-forming means being responsive to a third control signal to move between a receiving and a transfer position;

first actuating means for supplying said second control signal



to said receiving and supporting means to move it to said extended position so that each layer formed thereon is deposited on said stack-forming means to form a stack;

second actuating means for supplying said third control signal to said stack-forming means so that said formed stack is transferred to said transfer position so that said formed stack may be discharged; and

third actuating means for supplying said first control signal to said supplying means to control the rate of supply of bundles to said loading station so that it is synchronized with the rate at which bundles are arranged into layers to form stacks.

4,041,854

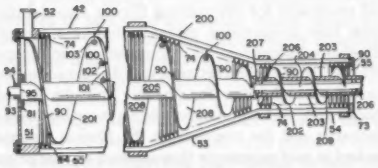
SLUDGE DEWATERING

Clyde H. Cox, 12723 Gaylawood Drive, Houston, Tex. 77066

Division of Ser. No. 477,797, June 10, 1974, Pat. No. 3,938,434, which is a continuation-in-part of Ser. No. 342,772, March 19, 1973, abandoned. This application Oct. 2, 1975, Ser. No. 619,048

Int. Cl.² B30B *9/14*

U.S. Cl. 100—112 **12 Claims**



1. A device for dewatering sludge, including in combination:

a filter-dewatering shell having an initial portion, a succeeding portion and a terminal portion, each comprising means for exit of fluid and retention of solid particles,

filtrate collection means outside said shell and spaced therefrom, for collecting filtrate,

a main shaft along the axis of said filter-dewatering shell in said initial and succeeding portions and having a reduced-diameter portion in said terminal portion,

a secondary shaft rotatably mounted on said reduced-diameter portion of said main shaft in said terminal portion,

a main sludge compression blade secured to said main shaft

in said initial and succeeding portions, said blade providing means for wiping the inner surfaces thereof, said means for wiping comprising a coil-spring blade supported by said main blade along its radially outer edge,

a filter-cake-discharging blade secured in said terminal portion to said secondary shaft, and

power means for rotating said shafts at different speeds relative to each other.

4,041,855

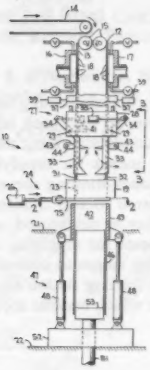
OPPOSED BOX BALING PRESS

Isaac Egosi, Kiryat Mozkin, Israel, assignor to Effic Trading and Services Ltd., Zurich, Switzerland

Continuation-in-part of Ser. No. 603,380, Aug. 11, 1975, Pat. No. 4,006,679. This application Aug. 4, 1976, Ser. No. 711,338

Int. Cl.² B30B *7/00*

U.S. Cl. 100—138 **6 Claims**



1. A baling press for forming bales of fibrous material, comprising:

a receptacle having infeed and discharge ends through which fibrous material is conveyed;

means for conveying fibrous material into said receptacle through said infeed end;

packing means including leg members axially movable along said receptacle for pre-packing fibrous material therein;

co-axial bale compression means including a compression chamber adjacent said discharge end of said receptacle;

a shiftable gate disposed between said discharge end and said compression chamber for opening and closing said discharge end, said leg members being movable toward said discharge end for transferring the fibrous material pre-packed in said receptacle through said discharge end into said compression chamber for compression into bales;

said gate being slotted so as to permit said gate to be closed over said discharge end while said leg members extend into said compression chamber during transfer of the pre-packed fibrous material thereinto, whereby said leg members serve to restrain the pre-packed fibrous material within said compression chamber, and whereby said leg members may be moved away from said discharge end while said gate is closed; and

said compression means including means for shifting said chamber to expose the bale for removal away from said compression means.

4,041,856

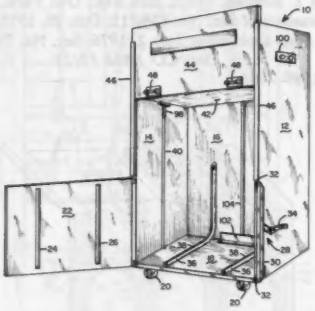
BALING MACHINE WITH IMPROVED PLATEN DRIVE AND GUIDE ASSEMBLY

Anthony Fox, 8306 Queen Ave. South, Minneapolis, Minn. 55431

Filed Sept. 26, 1975, Ser. No. 616,929

Int. Cl.² B30B *1/34, 15/04*

U.S. Cl. 100—214 **1 Claim**



1. In a baling machine of the type including a cabinet having top, bottom, right and left side walls and a rear wall and a rectangular platen having a central longitudinal axis being disposed for vertical motion within said cabinet, the improvement comprising:

a. first and second hydraulically actuatable cylinders disposed in said cabinet between said top and the upper surface of said platen, each cylinder having a ram arranged in extensible disposition therewithin;

1. said first cylinder having a first end pivotally attached to said top and to said right side wall and the free end of its ram pivotally attached to said platen at a point proximate the left edge of said platen, and laterally offset from the central longitudinal axis thereof in a certain first transverse direction;

2. said second cylinder having a first end pivotally attached to said top and to said left side wall and the free end of its ram pivotally attached to said platen at a point proximate the right edge of said platen, and laterally offset from the central longitudinal axis thereof in a direction opposed to said first transverse direction;

b. first and second vertical slots formed in said right and left side walls, with said slots being generally along said central longitudinal axis, respectively;

c. first and second guide bars affixed to the right and left edges of said rectangular platen and extending at least partially into said first and second vertical slots;

d. said rectangular platen comprising:

1. a rectangular metal plate having a top and a bottom surface;

2. first and second reinforcing bars affixed to the upper surface of said metal plate and extending diagonally thereacross;

3. third, fourth, fifth and sixth reinforcing bars affixed to the upper surface of said plate along the perimeter thereof; and

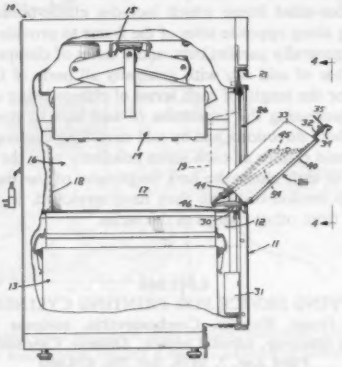
4. first and second triangular shaped metal side members attached to said upper surface of said metal plate at the left and right edges respectively, said first and second guide bars being attached to said triangular shaped metal side members and extending perpendicular to the top and bottom surfaces of said metal plate.

4,041,857

TRASH COMPACTOR

Charles B. Weeks, Boston, Mass., assignor to Norris Industries, Inc., Los Angeles, Calif.

Filed June 11, 1976, Ser. No. 695,258
Int. Cl.[2] B30B *15/30*
U.S. Cl. 100—215 10 Claims



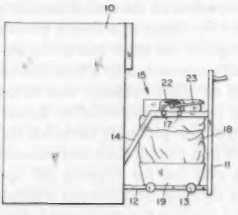
1. A household trash compactor including a housing having a chamber in which a bag is to be held open to receive trash, compacting means includig a compacting head and a drive operable to reciprocate said head between an upper inoperative position and lower compacting positions which depend on the extent of the trash build-up, a front panel having a port opening into the compactor below but adjacent said inoperative position, and a door closing said port and including first and second parts, said first part including a front wall and sides which extend into the compactor a predetermined extent when the door is closed, said second part including a rear wall and upper and lower end walls hingedly connected thereto, means extending transversely of the bottom of the port to which the lower end wall is fixed, and a hinge connection between the upper end wall and said first part, said rear wall, when the door is closed, positioned substantially flush with the inner edges of the sides of said first part and, as said door is pulled open, said second part collapsing to bring said first and second parts into a chute-establishing relationship.

4,041,858

HOUSEHOLD COMPACTOR FOR WASTE MATERIALS

John Kenneth Crister Gustavsson, Savsjo, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

Filed June 12, 1975, Ser. No. 586,148
Claims priority, application Sweden, June 13, 1974, 7407789
Int. Cl.[2] B30B *15/00*
U.S. Cl. 100—229 A 5 Claims



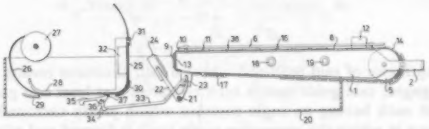
1. In a household compactor having a press unit and a bed plate, said bed plate being movable between two positions, one position being in vertical alignment with said press unit and the other position being a condition in which said bed plate is entirely removed from said press unit; the invention comprising a detachable hollow cylinder, means mounting said cylinder above said bed plate, a flexible container surrounding at least the bottom of said cylinder, the latter constituting two cylinder halves, said cylinder being divided along diametrically opposite generatrices which in the upper part pass into V-shaped notches, each cylinder half being provided with two lugs, each of said lugs co-acting with the corresponding lug of the other cylinder half, said co-acting lugs being pivotable in pairs about a common shaft, and a spring interconnecting the co-acting lugs whereby a force is applied thereto so that the ends of the cylinder halves facing said bed plate move laterally to form a larger spacing therebetween than the spacing between the ends at the opposite ends of said cylinder halves.

4,041,859

MARKING MACHINE

Uno K. Gillstrom, Alvkvarnsvagen 133, S-163 54 Spanga, Sweden

Filed Nov. 21, 1975, Ser. No. 634,102
Int. Cl.[2] B41J *1/60*
U.S. Cl. 101—111 1 Claim



1. A marking machine comprising a frame, a pressure distributing pad adapted to support a label mounted on said frame, carriage means mounted for reciprocating movement relative to said pad, a backing plate secured to said carriage means in opposed parallel relation to said pad, pulley means rotatably mounted on said carriage means, a plurality of type bands disposed over said pulley means and said backing plate, supporting plate means secured to said carriage and extending the entire distance between said pulley means and said backing plate for supporting said type bands along the entire distance between said pulley means and said backing plate, cover plate means secured to said supporting plate means in spaced apart parallel relationship to said supporting plate means to define a guiding channel for said type bands, said cover plate means having a window for viewing said type bands and a plurality of longitudinal slots, one for each type band extending parallel to said type bands, displacing means attached to each band and projecting through a respective slot for displacing each band, each type band comprising an inelastic band, a first series of consecutive type plates with individual symbols secured to said band and a second series of type plates identical to said first series secured to said band and elastic means connecting the opposite ends of said band, said second series coacting with said window so that a type plate disposed on said backing plate corresponds to a type plate disposed beneath said window, said backing plate and said supporting plate means being disposed substantially at right angles to each other whereby said elastic means of said type bands allows said type plates to make the transition from said supporting plate means to said backing plate upon movement of the bands without damaging said bands.

4,041,860

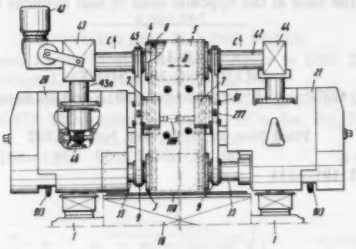
SCREEN PRINTING MACHINE

Mathias Mitter, Verl, Germany, assignor to Mitter & Co., Schloss Holte, Germany

Filed Apr. 24, 1975, Ser. No. 571,410
Int. Cl.[2] B41F *15/10, 15/38*
U.S. Cl. 101—122 18 Claims

2. In a screen printing machine, a combination comprising at least two guide rollers each having a shaft; further comprising

bearing means journalling said shafts at opposite ends of said rollers for rotation; and support members mounted on and each embracing one of said shafts in the region of the respective bearing means; an endless printing screen having two lateral edge portions and being trained about said guide rollers for travel in an endless path; abutment means mounted on said edge portions for travel with said screen; tensioning means engaging said abutment means and operative for tensioning said screen in transverse direction by urging said abutment means of the respective edge portions apart from one another, said tensioning means comprising guide means mounted on said support members and having guide tracks which extend



lengthwise of said path and wherein said abutment means are engaged, said guide means each comprising at least one guide unit each having an angle member which partly surrounds a space in which the respective guide track is formed and which space has an open side, a cover member mounted on said angle member overlying said open side and a respective edge portion of said screen, and a block member located in said space and in part bounding said guide track, said block member being mounted on its associated angle member adjustable relative to the same; and means for shifting said block members of the guide units at said edge portions in unison relative to their associated angle member.

4,041,861

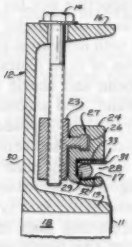
SCREEN PRINTING FRAME WITH FLOATING STRETCH-CLAMPS

David L. Alter, 112 Briarcliff Court, Hoffman Estates, Ill. 60172

Filed June 2, 1975, Ser. No. 582,742

Int. Cl.² B41F *15/36*

U.S. Cl. 101—128.4 **7 Claims**



5. A rigid four-sided frame for stretching screen printing fabrics including clamp-holding bars extending along all four sides of the frame to provide two sets of opposed generally parallel bars; and a series of clamps carried by each of said bars, for clamping an edge portion of said fabric therein with generally all parts of the edge portion for the length of each series being clamped in said series of clamps; and means for increasing the separation of each series of clamps from the other series of the same set, to stretch the fabric in the direction of their separation; at least some of said clamps of each series relatively near the ends of the bars being readily shiftable along the bars lengthwise of the bar, while subject to the tension of fabric they have stretched, to separate minutely from other clamps in the series under the influence of the stretching of the fabric lengthwise of one pair of bars by the increased separation of the other pair of bars.

6. The method of stretching a screen-printing fabric substantially free of distortion which comprises clamping edge portions of its four sides in clamps carried along the four sides of a rigid four-sided frame which includes clamp-holding bars extending along opposite sides of the frame to provide a set of opposed generally parallel bars, and a series of clamps carried by each bar of said set; with generally all parts of the edge portion for the length of each series of clamps being clamped therein; increasing the separation of said bars to stretch the fabric in both directions; and by said stretching causing at least some of said clamps of each series relatively near the ends of the bars to shift along the bars lengthwise of the bar, while subject to tension of fabric they have stretched, to separate minutely from other clamps in the series.

4,041,862

TRIPPING DEVICE FOR PRINTING CYLINDERS

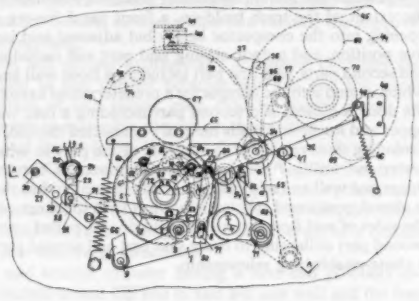
Jaroslav Jiruse, Blansko, Czechoslovakia, assignor to Adamovske Strojirny, narodni podnik, Adamov, Czechoslovakia

Filed Apr. 7, 1976, Ser. No. 674,601

Claims priority, application Czechoslovakia, Apr. 10, 1975, 2450/75

Int. Cl.² B41F *7/06, 13/28*

U.S. Cl. 101—218 **2 Claims**



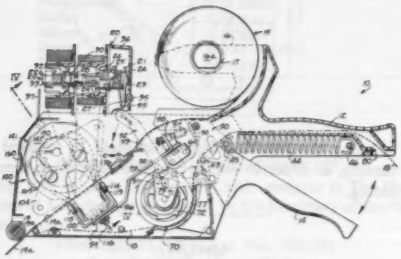
1. A device for tripping printing cylinders into printing pressure contact, particularly on offset printing machines, comprising a multi-arm lever fixed on a first pivot and having a first follower roller and a second follower roller, said rollers being in riding contact with a double disk cam, said lever being connected by means of a second pivot to a second pull rod, by means of a third pivot to a control pull rod, and by means of a first connecting rod to an operating lever, said operating lever being pivotally mounted on the end of the first pivot and being further connected by means of a fourth pivot to one end of a second connecting rod, the other end of the second connecting rod being pivotally connected to a first control arm mounted on a first shaft of an offset cylinder, and further comprising a second operating pull rod connected by means of a fifth pivot to a second control arm pivotally mounted on a second shaft, a control lever on said second shaft and connected by means of a first operating pull rod for tripping off operation with an operating link for tripping off operation which cooperates with a roller of a feeler element for the control of paper sheets, said feeler being mounted on an impression cylinder, whereby the second control arm coacts with one end with a first operating roller of a first microswitch and the second follower roller coacts with a second operating roller of a second microswitch.

4,041,863

PRECISION HAND LABEL IMPRINTER AND DISPENSER

James W. Mullen, Moraga; Boone K. McReynolds, Concord, and Herbert D. Pace, Pleasanton, all of Calif., assignors to Vidac Corporation, Concord, Calif.

Filed July 18, 1975, Ser. No. 596,948
Int. Cl.[2] B41F *3/20;* B41J *33/12;* B41K *3/58*
U.S. Cl. 101—269 18 Claims



1. A hand-held precision label printer/dispenser comprising:

a case mechanism having a handle extending therefrom and an applicator means mounted in said case remote from said handle;

a lever means pivotally mounted adjacent to said handle for manually operating the printer;

slide means mounted in said case having a carrier mounted thereon for reciprocal movement, said carrier having a platen surface associated therewith;

planar print surface means mounted in said mechanism case adjacent to said carrier and engageable by said platen surface;

control means associated with said carrier and said planar print surface operable to cause said platen surface to engage said planar print surface means and separate therefrom;

linkage means interconnecting said lever means with said carrier and operable to move said carrier from its initial position in which said control means has positioned the platen surface for engagement with said planar print surface means to a second position wherein the control means will separate said platen surface from said planar print surface means whereby said planar surface will not engage said planar print surface means when it returns to its first position;

printing medium feed means and label stock feed means oriented normal to another and operable to place said printing medium and label stock in contiguous relationship with said printing surface whereby said platen surface will imprint the data on said planar print surface means on said label when the carrier moves from said initial position to said second position and said label stock feed means and printing medium feed means can advance when said carrier returns from said second position to its initial position due to the separation between said platen surface and said planar print surface means;

feed linkage means interconnecting said lever means with said printing medium feed means and said label stock feed means operable to advance said label stock feed means and said printing medium feed means as said carrier returns from such second position to its initial position; and

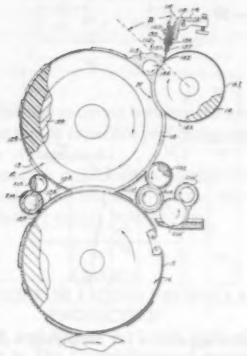
said printing medium means having supply and takeup spools coaxially mounted with spindle units on a common spindle, said common spindle having a one-way clutch connected to said feed linkage means whereby a loop of ribbon between said spools mounted on said spindle units is advanced by said feed linkage means, with one of said spindle units being operatively retained by detent means whereby it can be removed to facilitate loading new spools and removing old spools containing said ribbon providing the printing medium.

4,041,864

METHOD AND APPARATUS FOR INKING PRINTING PLATES

Harold P. Dahlgren, Dallas, Tex., and Harvey W. Dahlgren, Mobile, Ala., assignors to Dahlgren Manufacturing Company, Dallas, Tex.

Continuation of Ser. No. 251,740, May 9, 1972, abandoned. This application Apr. 24, 1975, Ser. No. 571,494
Int. Cl.[2] B41F *31/06*
U.S. Cl. 101—350 16 Claims



1. A method for inking the rotating applicator roller of a printing press so as to form thereon a uniform layer of ink of controllable thickness and to remove from the applicator roller any undesirable ink accumulations and image forming variations in the inked surface of the applicator roller that supplies ink for a printing member of said printing press, comprising the steps of

a. applying to a surface of said applicator roller which has previously supplied ink for said printing member during the rotational cycle of the applicator roller a volume of ink which exceeds the volume of ink to be next supplied for said printing member by that surface of the applicator roller and which is sufficient to destroy any image forming variations in the inked surface of said applicator roller;

b. forming a metering nip between said applicator roller and a metering unit;

c. initially forming on said metering unit at a point removed from said metering nip a substantially uniform, uninterrupted film of ink having a controllable film thickness;

d. contacting at the metering nip the ink on the surface of said applicator roller which has been provided with said excess of ink with said substantially uniform, uninterrupted film of ink supported on the metering unit and moving at a speed different from the speed of said applicator roller surface to cause said film of ink to shear ink from said applicator roller,

e. varying the physical properties of said film of ink on the metering unit to provide a continuous uniform metering surface of ink having uniform physical properties at the metering nip which upon contact with the ink on the applicator roller will remove all but a uniform layer of ink of a desired thickness from said applicator roller; and

f. upon the occurrence of changing conditions which cause variation in the desired thickness of the layer of ink on the surface of the applicator roller, adjusting one or more of the physical properties including thickness, viscosity or

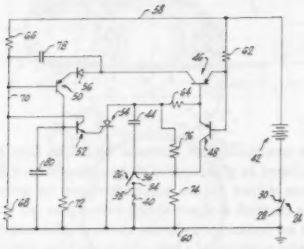
temperature of the film of ink moving from the point of formation thereof to the metering nip to maintain said uniform physical properties of the metering surface of ink at the metering nip to cause said metering surface of ink to maintain the uniform layer of ink of the desired thickness on the surface of said applicator roller as said applicator roller surface moves away from said metering surface of ink.

4,041,865

METHOD AND APPARATUS FOR DETONATING EXPLOSIVES

Seth F. Evans, Seal Beach, and Jairus Donn Hall, Newport Beach, both of Calif., assignors to Seth F. Evans, Seal Beach, Calif.

Filed June 4, 1975, Ser. No. 583,638
Int. Cl.² F42D *1/04*
U.S. Cl. 102—20 **40 Claims**



1. Detonator apparatus for supplying a firing current to a fuse, said apparatus comprising:

command switch means for initiating operation of said apparatus;

manually operable means for closing said command switch means from a location remote from said apparatus;

electrical time-delay and energy storage means, for generating a triggering signal after said command switch means has been closed for a predetermined time, and for simultaneously storing sufficient energy to fire the fuse, said electrical time-delay and energy storage means including resetting means for immediately reinitiating timing of the predetermined time in the event that said command switch means is opened and closed again; and

electrical means responsive to the triggering signal, for initiating a firing current to the fuse, whereby said electrical time-delay and energy storage means is incapable of firing the fuse without a sustained closure of said command switch means for the predetermined time.

4,041,866

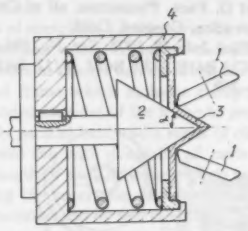
PROCESS FOR THE MANUFACTURE OF A BIMETALLIC FACING FOR HOLLOW CHARGES

Michel J. Thevenin, Paris; Michel Brun, Pau; Jacques Boileau, Paris, and Joseph Pegoud, Arpajon, all of France, assignors to Societe Nationale des Poudres et Explosifs and Etat Francais, both of, France

Filed Apr. 15, 1975, Ser. No. 568,265
Claims priority, application France, Apr. 17, 1974, 74.13409
Int. Cl.² F42B *1/02*
U.S. Cl. 102—24 HC **4 Claims**

1. Process for the manufacture of a conical bimetallic facing for hollow charges, characterized in that it comprises two successive stages:

a. explosive overlaying of two blanks of metals of different types, one of which metals is intended to form the inside of the conical facing and is copper or a copper alloy and the other of which metals is able to give rise to a core which disappears either by volatilisation or by disintegration under the conditions of elevated temperature and pressure which develop when the hollow charge is fired, and is intended to form the outside of the conical facing and is aluminium, and



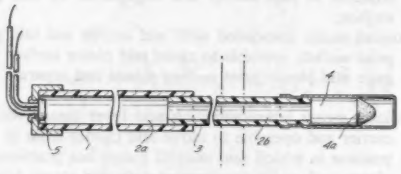
b. shaping the resulting bimetallic plate by conical flow turning, in order to obtain the desired conical bimetallic facing.

4,041,867

CONDUCTOR CONTAINING EXPLOSIVE GAS MIXTURE FOR INITIATION OF IGNITION ELEMENT AND EXPLOSIVE CHARGE

Bertil Petrus Enoksson, Gyttorp, Sweden, assignor to Nitro Nobel AB, Gyttorp, Sweden

Filed Apr. 12, 1976, Ser. No. 640,953
Claims priority, application Switzerland, Dec. 20, 1974, 16111/74
Int. Cl.² C06C *5/04*
U.S. Cl. 102—27 R **7 Claims**



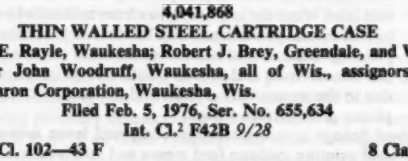
1. In a tubular fuse for initiation of an ignition element, such as a detonation cap provided with a solid ignition substance, said tubular fuse being filled with an explosive gas, wherein the improvement comprises: means formed on at least a portion of the inner circumferential surface of said tubular fuse for creating turbulence of said explosive gas, the turbulence created by said means aiding in the propogation and continuation of a detonation of the explosive gas to the ignition element.

4,041,868

THIN WALLED STEEL CARTRIDGE CASE

Roy E. Rayle, Waukesha; Robert J. Brey, Greendale, and Wilbur John Woodruff, Waukesha, all of Wis., assignors to Amron Corporation, Waukesha, Wis.

Filed Feb. 5, 1976, Ser. No. 655,634
Int. Cl.² F42B *9/28*
U.S. Cl. 102—43 F **8 Claims**



1. A thin walled steel cartridge case, comprising a head

having a primer cavity, a hollow tapered thin wall section extending outwardly from the head and terminating in an open mouth, the inner surface of the head having an annular groove located concentrically of the primer cavity, and a generally curved outward diverging surface connecting the annular groove with the wall section, said case being formed of a steel having the following composition in weight percent:

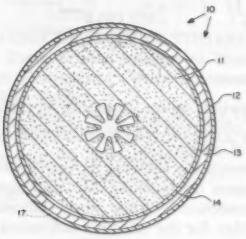
Carbon	0.18 – 0.23
Manganese	0.80 – 1.10
Phosphorus	0.03 max.
Sulfur	0.04 max.
Silicon	0.10 max.
Boron	0.0005 – 0.003
Iron	balance.

4,041,869

COOK-OFF LINER COMPONENT

Anthony San Miguel, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 15, 1976, Ser. No. 705,734
Int. Cl.² F42B *13/00, 25/20*
U.S. Cl. 102—56 R **10 Claims**



1. An ordnance item which exhibits an increased ability to survive exposure to a high temperature environment, said item comprising:

a casing for containing an energetic material;

energetic material including an oxidizer contained within said casing;

a first liner forming a continuous layer between said casing and said energetic material; and

a second liner forming a layer between said first liner and said energetic material;

said first liner being made from a first material which chemically degrades at a predetermined temperature to form a gaseous fuel, and said second liner being made from a second material which remains intact at said predetermined temperature and which second material is impervious to penetration by said gaseous fuel and said oxidizer;

for preventing combustion of said gaseous fuel and resultant ignition of said energetic material when said ordnance item is exposed to said high temperature environment.

4,041,870

CIRCUIT ARRANGEMENT FOR SUPPLYING CLOCK PULSES TO A PROJECTILE FUZE

Godwin Ettel, Zurich, Switzerland, assignor to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG, Zurich, Switzerland

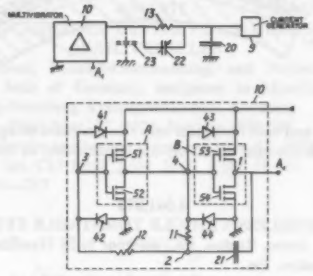
Filed Dec. 5, 1975, Ser. No. 638,060
Claims priority, application Switzerland, Dec. 10, 1974, 16418/74
Int. Cl.² F42C *19/12*; F42B *9/00*; F42C *11/06, 9/00*
U.S. Cl. 102—70.2 GA **3 Claims**

1. A circuit for supplying clock pulses for a projectile fuze comprising:

a. a current generator producing an induced current during firing acceleration of the projectile;

b. a supply capacitor charged by said current generator;

c. an astable multivibrator with field-effect transistors supplied with a supply voltage and controlled by said supply capacitor after acceleration of the projectile;



d. a resistor connected in circuit between the astable multivibrator and the supply capacitor preventing rapid dropping of the supply voltage; and

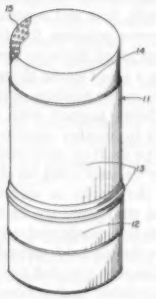
e. a trimmer capacitor connected in parallel with said resistor for stabilizing the frequency of the clock pulses by supplying a further supply voltage.

4,041,871

SHOCK BUFFER FOR LIQUID PROPELLANT GUN PROJECTILE

Leroy M. Stayton, and Robert A. Gould, both of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 15, 1976, Ser. No. 705,733
Int. Cl.² F42B *13/00, 7/08*
U.S. Cl. 102—95 **6 Claims**



1. A projectile for a liquid propellant gun comprising a metallic forward end and an aft end which is a shock buffer made up of microballoons bound in a binder resin.

4,041,872

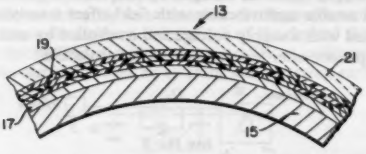
WRAPPER, STRUCTURAL SHIELDING DEVICE

Thomas E. McCown, Los Angeles; Ken A. McClymonds, Woodland Hills, and Robert W. Halprin, Los Angeles, all of Calif., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sept. 10, 1971, Ser. No. 179,531
Int. Cl.² F42B *13/00*
U.S. Cl. 102—105 **4 Claims**

1. A shielding device comprising a housing structure with a layer of tin mounted thereon, a layer of fiberglass mounted

about said tin layer and an outer layer of thermal insulation material mounted on said fiberglass whereby said thermal



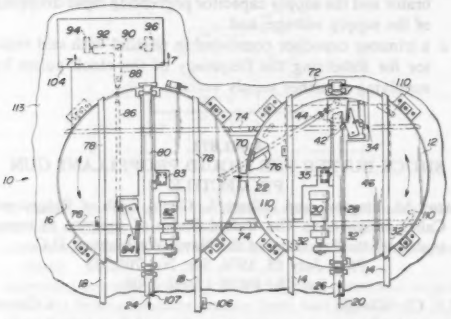
insulation and said fiberglass serve to maintain integrity of said tin layer when said shield device is subjected to radiation.

4,041,873

DRIVERLESS VEHICLE TURNTABLE SYSTEM

Vercoe C. Jones, Easton, Pa., assignor to Si Handling Systems, Inc., Easton, Pa.

Filed Aug. 25, 1975, Ser. No. 607,164
Int. Cl.[2] B61J *1/02*; B61B *13/12*
U.S. Cl. 104—35 **12 Claims**



1. A driverless vehicle turntable system comprising first and second stationary track, first and second turntables interconnected for simultaneous rotation for transferring driverless vehicles from said first set of tracks to said second set of tracks, each turntable having a set of tracks aligned with a set of tracks on the other turntable in one position of the turntables, each set of turntable tracks being aligned with one of said first and second sets of tracks in another position of the turntables, a discrete rotatable drive shaft on each turntable for propelling a vehicle supported by its associated turntable, said drive shafts being coaxial when the tracks on said turntables are aligned with each other, and stationary tracks between and adjacent said turntables, said last-mentioned stationary tracks being aligned with the tracks on said turntables when said drive shafts are coaxial, a motor coupled to said first turntable for rotating said first turntable, and a connecting rod pivotably connected at its ends to said turntables so that said first turntable causes said second turntable to rotate in an opposite direction.

4,041,874

APPARATUS FOR ROTATING AND INDEXING MINIATURE TRAIN TURNTABLES

Clarke J. Gernon, Sr., 4660 Fleet Drive, Baton Rouge, La. 70809

Filed Dec. 23, 1975, Ser. No. 643,628
Int. Cl.[2] B61J *1/02*; B60S *13/02*
U.S. Cl. 104—38 **3 Claims**

1. A device for rotating and precisely positioning model railroad turntables in selective alignment with plural stationary tracks radiating from a turntable pit, comprising in combination with said stationary tracks:

A. a turntable having deck track thereon, said turntable being mounted upon a rotatable shaft within the pit;

B. an indexing disc keyed to the shaft;

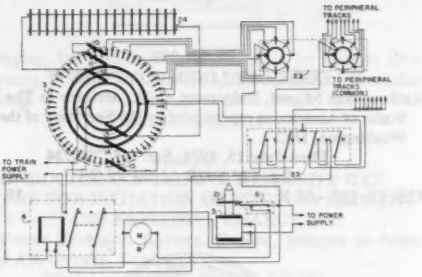
C. driving means engaging the shaft to provide torque to rotate the turntable and indexing disc;

D. locking means engageable and disengageable with the indexing disc to render the turntable immovable when engaged with the indexing disc;

E. an electric circuit within the system including:

E1. an electrical switch, the contacts of which are open as the locking means are engaged with the disc and closed when disengaged, said switch being in operative connection with the driving means;

E2. plural stationary contacts in the circuit, one each thereof corresponding to the respective plural tracks radiating from the turntable pit;



E3. rotary switch means to selectively energize a single stationary contact of the plural stationary contacts to the exclusion of others;

E4. two diametrically opposed moveable electrical contacts mounted upon the indexing disc, said moveable contacts having connection with the plural stationary contacts;

E5. a first relay for the selective activation of the locking means as the preselected single energized stationary contact may be encountered;

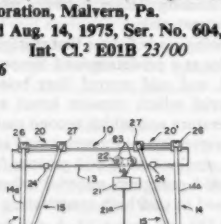
E6. a second relay interconnecting the moveable electric contacts and the first relay to determine which of said opposed moveable contacts may be sensitive to the electrical state of the stationary contacts.

4,041,875

ADJUSTABLE SINGLE-BEAM GANTRY

Bernard E. Wallace, Exton, Pa., assignor to B. E. Wallace Products Corporation, Malvern, Pa.

Filed Aug. 14, 1975, Ser. No. 604,682
Int. Cl.[2] E01B *23/00*
U.S. Cl. 104—126 **12 Claims**



1. In a load-handling gantry, a single, unitary, bridging beam in combination with leg, brace, and mounting components so supporting said beam as to provide adjustment of gantry span, height, and spread, and use of the gantry in a number of leg and brace configurations, said components comprising: legs arranged in pairs with the legs of each pair spanning the beam,

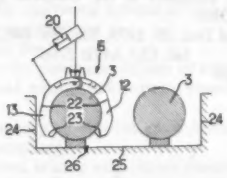
and extending downwardly and diverging laterally of the beam; a bracing struct associated with, and disposed to brace, each leg; a pair of rod-like mounting assemblies each supported directly upon said unitary bridging beam, movable along the beam to selected positions to vary the span between said assemblies, and including clamping means frictionally securing said assemblies in said positions; and means for coupling upper portions of the legs of each pair, and of the bracing struts for said legs, to a corresponding one of said assemblies, and establishing, between the coupled upper portions of each leg and its strut, a distance which is substantially fixed, said means for coupling also including apparatus coupling a lower portion of each bracing strut to an intermediate portion of its corresponding leg, in a position in which each strut extends upwardly and away from its leg, said mounting assemblies and coupling meanns being so configured, and disposed with respect to each other and to said beam, as to afford lateral clearance between the beam, legs, and struts sufficient to permit location of said assemblies, with their coupled legs and struts, at various positions along the length of said beam, and said coupling means further being adjustable, while substantially maintining said fixed distance, to accommodate arranagement of the bracing struts for the legs of both pairs in configurations either inboard or outboard of the legs thereof, or in configuration in which the bracing struts of one leg pair are arranged inboard and the bracing struts of the other leg pair are arranged outboard.

4,041,876

VEHICLE GUIDING SYSTEM

Robert Michel, Paris, France, assignor to Transports-Recherches-Etudes et Groupement d'Interet Economique (Tregie), Rueil-Malmaison, France

Filed Sept. 9, 1975, Ser. No. 611,724
Claims priority, application France, Sept. 13, 1974, 74.31110; United Kingdom, Aug. 28, 1975, 35554/75
Int. Cl.[2] E01B *25/02, 25/28*
U.S. Cl. 104—130 **5 Claims**



1. A guidance system for guiding a vehicle on a track, comprising

a track having a guidance member of circular cross-section;

a guide detector carried on a vehicle for contacting the guidance member to provide information as to the position of the vehicle with respect to the guidance member and having an internal contact surface complementary to the said circular-section guidance member, the contact surface extending around more than one half of the circumference of the circular-section guidance member to ensure a positive retention of the detector thereon;

a fork in the track at which the track forks into two branch tracks, walls extending along the opposite sides of said guidance member at said fork, the guidance member no longer being a single circular member but rather being progressively broadened at the fork until it divides into two guide members, one for each branch track;

means mounted on the vehicle for tilting the detector about the axis of its internal contact surface to a selected side of a median position to select one branch of the fork;

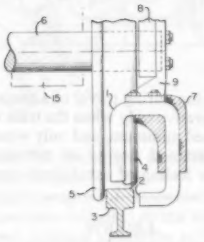
the broadened guidance member at the fork having a height less than that of the circular-section guidance member but having on each side a lower peripheral portion in the form of a part of a circle of the same diameter as the circular-section guidance member, whereby when the detector is tilted at a fork, a raised side thereof rides over the said broadened guidance member, each of said lower portions defining with the adjacent said wall a means for positively retaining the lower side of the tilted detector in operative engagement with said guidance member.

4,041,877

LATERAL GUIDANCE DEVICE FOR WHEEL SETS OF RAIL VEHICLES

Michael Simon, Munich-Obermenzing, and Norbert Degen, Munich, both of Germany, assignors to Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft, Germany

Filed Mar. 17, 1975, Ser. No. 558,539
Claims priority, application Germany, Mar. 16, 1974, 2412823
Int. Cl.[2] B61F *5/44, 5/50, 9/00, 19/00*
U.S. Cl. 104—242 **7 Claims**



1. Lateral guidance apparatus for laterally guiding a wheel set of a rail vehicle as wheel means of the wheel set travel in a longitudinal direction along a support rail; said apparatus comprising:

magnet means, and

magnet support means for supporting said magnet means at said wheel set such that force interaction between magnet pole means of said magnet means and guide rail means effects lateral guidance of said wheel set with respect to said support rail, said magnet means and said guide rail means being continuously spaced from one another,

wherein pole faces of said magnet means extend longitudinally along the support rail when in operative positions carried by said vehicle, and wherein said magnet means includes at least one electromagnet having a multi-piece pole shoe with a plurality of pole faces disposed longitudinally spaced from one another along the support rail.

4,041,878

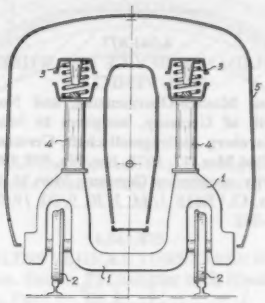
SPEED AND TRACK CURVATURE SUSPENSION CONTROL SYSTEM

Angel Toran, Madrid, Spain, assignor to Patentes Talgo, S.A., Madrid, Spain

Filed Apr. 11, 1975, Ser. No. 567,375
Int. Cl.[2] B61F *3/12, 5/24, 5/38, 5/50*
U.S. Cl. 105—164 **6 Claims**

1. In a pendular suspension system for use in a train having a plurality of cars, including resilient means located independent from one another symetrically on either side of a central vertical longitudinal plane of a vehicle and bearing upon a running gear frame and carrying at least one adjacent body, the resilient means bearing upon a base located above the center of gravity of the body and being able to yield vertically and horizontally in relation to the unbalance of centrifugal force, the improvement which induces an additional inclination, over that of the cant, of the body while the vehicle is traveling a canted curved path and allows occurance of the relative movements tending to be produced between the body and the running gear, comprising: the resilient means being independent pneumatic springs of the diaphragm type having air inlet and

exhaust means for level adjustment, and means operatively associated with the air inlet and exhaust means for effectively reducing flow of air therethrough and maintaining the springs distorted vertically and the body tilted in response to the



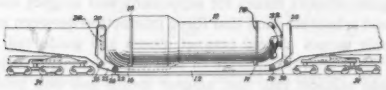
centrifugal force arising during travel of a canted curved path, said means being operative only when the train reaches a speed above a predetermined minimum, and only when the track has a sufficient predetermined degree of curvature to thereby reduce the passenger feeling of unbalanced centrifugal force.

4,041,879

SCHNABEL-TYPE CAR

Charles R. Cockrell, Chattanooga, Tenn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Dec. 1, 1975, Ser. No. 636,498
Int. Cl.[2] B61D *3/12, 3/14, 3/16, 45/00*
U.S. Cl. 105—366 R **7 Claims**



1. A Schnabel-type car having independent wheeled sections at opposite ends that transport an elongate rigid load therebetween, an angular support means carried by each wheeled section in the form of a bell-crank including an upright arm and a horizontal arm, pivotal means at the intersection of the horizontal and vertical arms connecting each bell-crank to a wheeled section of the car, an elongate load carrying skid extending between wheeled sections of the car, means pivotally connecting the elongate skid to confronting ends of the horizontal arms, and compression pads on confronting surfaces of the upright arms adapted to contact the elongate rigid load supported on said skid whereby forces effected by the load bearing upon the skid are transmitted to the ends of the load through the compression pads.

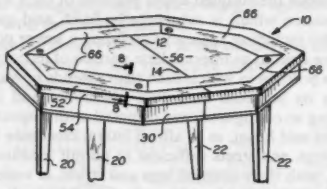
4,041,880

CONVERTIBLE POKER TABLE

Milton Schankman, Valley Stream, N.Y., assignor to Stakmore Co., Inc., New York, N.Y.

Filed Nov. 21, 1975, Ser. No. 634,285
Int. Cl.[2] A47B *3/00*
U.S. Cl. 108—112 **9 Claims**

1. A poker table including a table top having a perimeter which is a polygon with sides of substantially equal length having an even number of sides and having at least six sides, the table top comprising two sections, hinges connecting said sections together for movement between an extended position and a folded position in which the sections overlap one another for convenient storage, detachable fastening means on the sections near the hinges for preventing folding of said sections when they are in extended position forming the top of the table when set up and ready for use, four legs attached to the sections on the undersides thereof, two of the legs being attached to each section of the table and folding substantially parallel to the undersides of the respective sections of the table, and movable into positions substantially normal to the table top for supporting the table when in use, characterized by chip-holding recesses in the top surface of said sections near the periph-



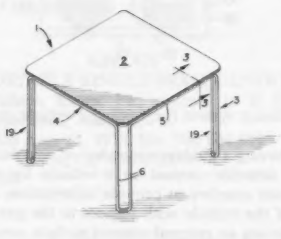
eral edges of the table top, a plurality of fillers that fit into the upper portions of the chip-holding recesses and that provide bridging surfaces closing the upper ends of the recesses, the table top having portions outward of the recesses, the top surface of the table above the recesses and above the portions outward of the recesses being substantially flush with the top surface of the sections inward of the chip-holding recesses when the fillers are in position closing the recesses whereby the table can be used as a dining table.

4,041,881

FURNITURE ARTICLE

Melvin A. Textoris, Struthers, and William Wahl, Chagrin Falls, both of Ohio, assignors to GF Business Equipment, Inc., Youngstown, Ohio

Filed Dec. 29, 1975, Ser. No. 645,234
Int. Cl.[2] A47B *3/06*
U.S. Cl. 108—159 **10 Claims**

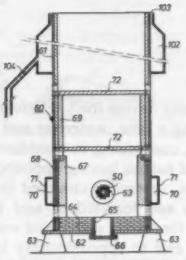


1. A table including, a planar top, a support assembly extending beneath the lower surface of said top comprising an endless elongated stock defining a plurality of U-shaped legs each said leg including a pair of vertical leg members, a horizontal top member joining one said member of each said leg to one said member of an adjacent said leg whereby, each said horizontal top member and said leg member joined to its end defining a support component having an inverted U-shaped configuration, said top having a vertical peripheral edge extending from said planar top to a point short of said top lower surface, an arcuate relief surface in said top joining said vertical peripheral edge and said lower surface and having a configuration mating with a segment of the periphery of said horizontal top member, and means on each said horizontal top member engaging the lower surface of said table top to permit attachment of said support assembly to said table top

4,041,882
APPARATUS FOR INCINERATING NON-HALOGENATED WASTE LIQUIDS

Peter Gerard Dierckx, Mortsel, Belgium, assignor to AGFA-GEVAERT N.V., Mortsel, Belgium

Division of Ser. No. 527,595, Nov. 27, 1974, Pat. No. 3,980,417.
This application Mar. 1, 1976, Ser. No. 662,970
Claims priority, application United Kingdom, Nov. 29, 1973, 55391/73
Int. Cl.² F23G 7/00
U.S. Cl. 110—7 B 6 Claims



1. An installation for incinerating waste non-halogenated solvents, comprising:
an incinerator vessel
a burner assembly attached to said incinerator vessel for introducing into said vessel an atomized stream of solvents together with a stream of a mixture of compressed air and fuel, and comprising an atomizing nozzle unit, conduit means for delivering under pressure a stream of waste solvent to the nozzle of said nozzle unit, and conduit means for introducing a mixture of fuel and air through a plurality of orifices concentrically arranged around said nozzle into the incinerator vessel
pump means for delivering solvent to said burner assembly
a source of compressed air
a storage vessel for fuel
conduit means for passing a mixture of compressed air and fuel from said source and storage vessel to said burner assembly
a stack for discharging effluent gases from the incinerator into the atmosphere
a mantle disposed around said burner assembly
conduit means for passing air through said mantle and externally around said nozzle of said burner assembly into the incinerator, whereby the flame of the combusting mixture at the nozzle is stabilized
fan means for introducing air into said mantle and
means to filter the solvents prior to incinerating.

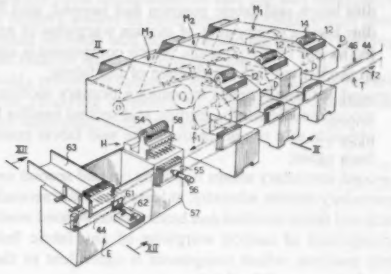
4,041,883
PROCESS AND PLANT FOR THE MANUFACTURE OF SEWN BOOKS

Gianattilio Meratti, Torre de' Roveri (Bergamo), Italy

Filed July 9, 1976, Ser. No. 703,986
Claims priority, application Italy, July 9, 1975, 68784/75
Int. Cl.² B42B 1/02
U.S. Cl. 112—21 10 Claims

1. A process for the manufacture of sewn books from a plurality of signatures, comprising: forming spaced holes in the spine of each signature, inserting through pairs of said holes a length of at least partly thermoplastic filament such that part of the filament extends between two such holes on the inside of the signature and portions of the filament extend out through the holes to the exterior of the signature, placing a plurality of such signatures in close relationship, and welding the respective exterior parts of the filaments of the signatures to respective transverse at least partly thermoplastic members, thereby joining the signatures together.

5. Apparatus for manufacturing sewn books from a plurality of signatures, the apparatus comprising:
stitching means for forming spaced holes in the spine of each signature and for inserting the leading end of a length of at least partly thermoplastic filament through one said hole and out through another said hole, whereby part of the filament extends between two such holes on the inside of the signature and the end portions of the filament extend out through the holes to the exterior of the signature;

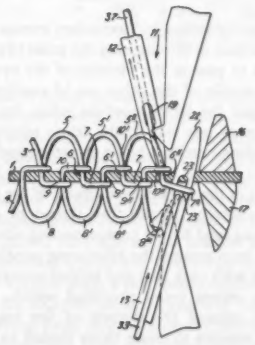


gathering means for placing the plurality of such signatures in close relationship;
means for bringing respective transverse at least partly thermoplastic members adjacent to the exteriors parts of the filaments; and welding means for welding the respective exterior parts of the filaments to the transverse members, thereby joining the signatures together.

4,041,884
APPARATUS FOR INSERTING SEAMS IN BASE FABRIC

Gerald Frank Ward, and Gordon Richard Wray, both of Loughborough, England, assignors to National Research Development Corporation, London, England

Continuation of Ser. No. 883,876, Dec. 10, 1969, abandoned.
This application Sept. 24, 1974, Ser. No. 509,021
Claims priority, application United Kingdom, Jan. 10, 1969, 1623/69
Int. Cl.² D05C 15/12
U.S. Cl. 112—79 R 5 Claims



1. Apparatus for producing a multiplicity of parallel lines of stitching to form a tufted fabric, comprising:
roller drive means, in use operating to advance a base fabric through a fabric position in a tuft insertion zone of the apparatus;
first needle bar means for supporting a set of needles on one side of said fabric position and second needle bar means for supporting a set of needles on the opposite side of said fabric position;
said roller drive means continuously advancing said base

fabric, when in position, at a substantially constant, non-intermittent, speed through said fabric position irrespective of whether any needles, when in position on said needle bars, are inserted through the base fabric in said fabric position;

first actuating means imposing a primary motion on said first needle bar for feeding said first needles from one side of and through the said fabric position and back again;

first secondary means imposing on said first needle bar a secondary motion whereby, at least when said first needles reach said fabric position and beyond, said first needles have a component of motion warpwise of any fabric fed in said fabric position, which component is equivalent to the driven rate of advance of the fabric;

second actuating means imposing a primary motion on said second needle bar for feeding said second needles from the opposite side of and through the said fabric position and back again;

second secondary means imposing on said second needle bar a secondary motion whereby, at least when said second needles reach said fabric position and beyond, said second needles have a component of motion warpwise of any fabric fed in said fabric position, which component is equivalent to the driven rate of advance of the fabric;

each of said first set of needles being arranged to co-operate with a corresponding needle of the second set of needles;

means for adjusting the speed of said roller drive means, in relation to the speed of operation of said first and second actuating means;

said second actuating means being driven in such relation to the movement of said first actuating means that the said first and second needles are fed alternately through the fabric position at substantially equally spaced intervals;

the general directions of feed and retraction of the first and second needles being inclined to each other and against the direction of fabric advance through the fabric position;

catch means in association with at least one of the two sets of needles, said catch means being situated in the vicinity of said tuft insertion zone and, in use, catching the threads of at least some of one of the sets of needles in their motions from and to said fabric position, the catch means being arranged to release said threads in the cycle of operations in use so as to leave tufting loops extending from the base fabric;

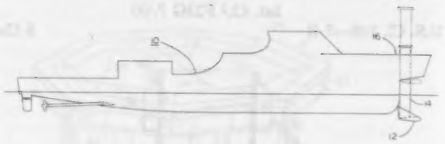
the said actuating means and secondary means of each of the two needle bars in turn causing the point of each of one set of needles to pass in the vicinity of the eye of its corresponding needle of the other set of needles, or between that eye and the fabric position when the eyes of both needles are on one side of the fabric position and as the corresponding needle is being retracted and the needle of the one set is being advanced towards the fabric position alternately in the respective motions of the two sets set of needles, whereby, in use, the thread of the retracting needle is engaged by the corresponding advancing needle to form a loop around the advancing needle P and means associated with each first and second actuating means and secondary means being provided which, in use of the apparatus, engage the threads of the retracting corresponding needles to cause those thread to tighten in the form of prone loops around the needles of the one set as the corresponding needles retract, whereby, in use, the threads of the set of needles will form loops lying prone on each side of a fabric passing through said fabric position, with said tufting loops extending on at least the one side of the fabric, each said tufting loop of one thread extending from one prone loop of the other thread at the point of insertion of the one thread into the fabric to the next prone loop of the other thread at the next point of insertion of the one thread.

4,041,885

APPARATUS FOR AND METHOD OF STABILIZING A MARINE VESSEL IN PITCH

Emilio C. Garcia, 441 Gravier St., New Orleans, La. 70130

Filed Dec. 31, 1975, Ser. No. 645,746
Int. Cl.[2] B63B *39/06*
U.S. Cl. 114—126 **1 Claim**



1. A pitch stabilizing device for a relatively narrow and fast marine vessel, having a bow, waterline and keel, and moving rapidly in high seas, comprising in combination:

a. vertical member means, having oppositely disposed upper and lower ends, vertically mounted in said bow and in alignment with and forward of said keel, said vertical member means for raising above said waterline and lowering said lower end to approximately keel level and forwardly thereof, and faired for its length to reduce resistance as it is moved rapidly through said high seas; and

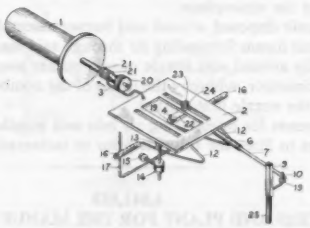
b. triangular shaped foil means, having zero lift characteristics and equal sides defining a leading angle, mounted on said lower end of said vertical member means and defining a dihedral angle therewith, said foil means extending forwardly and transverse said vertical member means and in alignment with said keel, whereby said foil means with zero lift characteristics when lowered to keel level at the bow of said rapidly moving narrow vessel engages said high seas to stabilize said vessel in pitch.

4,041,886

TIME LAPSE STEERING CONTROLS FOR SELF PROPELLED MODELS

Francis Knipp, 2009 Marshall St., Manitowoc, Wis. 54220

Filed Jan. 14, 1976, Ser. No. 648,924
Int. Cl.[2] B63H *25/00*
U.S. Cl. 114—144 R **13 Claims**



1. A time lapse steering control for self propelled model boats, cars, and airplanes, said steering control comprising:

a spring loaded dashpot, said dashpot acting as a timer to determine the instant when a turn will commence and the extent of the turn, and to provide power means to actuate the steering means of the model; said timer being equipped with a valve to regulate the rate at which fluid within the dashpot is forced through the timer;

a cam operatively linked to said timer to provide the actuating force for said steering means;

a cam follower acted on by said cam;

a lever arm fixed to and moving with said cam follower;

a supporting structure to which said timer, cam, and cam follower with fixedly attached lever arm are mounted to comprise an operative steering control unit; and a con-

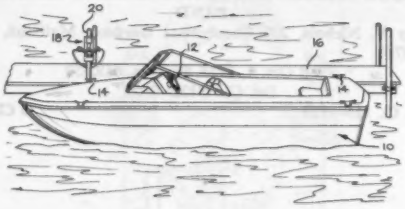
necting link which transmits the motion of said lever arm fixedly attached to said cam follower, to a coresponding lever arm fixedly attached to said steering means of the model.

4,041,887

DOCKING APPARATUS FOR BOATS

William A. Paul, 1808 Parkside Blvd., Toledo, Ohio 43607

Filed June 14, 1976, Ser. No. 695,660
Int. Cl.[2] B63B *21/00*
U.S. Cl. 114—230 **7 Claims**



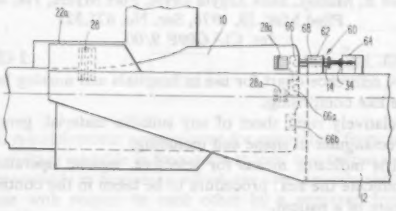
1. Apparatus for aiding in connecting a boat to a fixed upright member, said apparatus including, in combination, a boat having a line-engagable member thereon, a fixed upright member, a flexible line engaged with said upright member, holding means comprising at least one arm having one end movably supported on said upright member on the side of said upright member toward which the boat will approach with the other end of said arm having means for engaging said flexible line for holding a portion of said line above the level of said line-engagable member on the boat, at least the other end of said arm being movable in a vertical direction to move the portion of said line toward said line-engagable member, and means engagable with said arm and operable from the boat for actuating said holding means to drop said line around said line-engagable member, said operable means including means for enabling said arm to move downwardly to move said line toward engagement with said line-engagable member on the boat.

4,041,888

PUSH TUG-BARGE THRUST TRANSMITTAL MEANS

Ralph W. Hooper, Newtown Square, Pa.; Douglas A. MacLeod, Wenonah, N.J., and Clarence G. Murray, Media, Pa., assignors to Interstate and Ocean Transport Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 602,557, July 29, 1976, Pat. No. 3,993,014. This application Oct. 26, 1976, Ser. No. 735,435
Int. Cl.[2] B63B *21/56*
U.S. Cl. 114—248 **2 Claims**



1. Push tug and barge with thrust transmittal means comprising:

a. a thrust receiving member projecting rearwardly from the stern of said barge along its center line, said rearwardly projecting member including at its rear terminal point a convex hemispheric surface;

b. a non-projecting thrust exerting member mounted on the bow of said tug, said thrust exerting member having a hemispheric concave surface adapted to receive and mate with the convex surface of said thrust receiving member;

c. said two mating surfaces formed between said thrust receiving and thrust exerting members providing the sole means of transmitting pushing thrust to said barge from said tug while permitting relative pitching therebetween;

d. a notch at the stern of said barge with sidewalls on the two sides thereof, said barge stern and sidewalls and the bow of said tug being adapted so that said bow fits between said sidewalls upon engagement of said tug and barge, including fenders, rollers or other means through which contact is made between said sidewalls and said side of said tug to limit relative motion therebetween; and

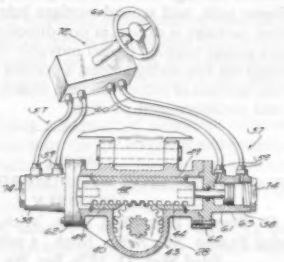
e. quickly releasable means independent of said cylindric and thrust receiving members, to restrain said tug and barge from separating from one another.

4,041,889

MARINE PROPULSION DEVICE STEERING ASSEMBLY

Clarence E. Blanchard, Kenosha, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Aug. 16, 1976, Ser. No. 714,809
Int. Cl.[2] B63H *5/12*
U.S. Cl. 115—18 R **10 Claims**

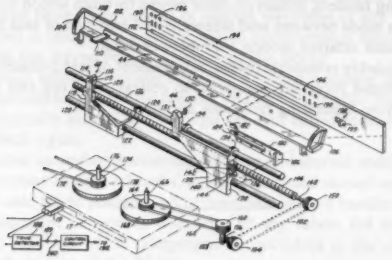


1. An outboard motor comprising a power head having an engine, a lower unit which carries said power head, said lower unit including a propeller adapted for rotation under water and a drive shaft housed within said lower unit and operatively coupled to said engine and to said propeller, and a swivel bracket adapted for mounting to a transom bracket for affording vertical tilting movement of said swivel bracket about a generally horizontal axis, said swivel bracket having a generally vertical bore and a generally horizontal cross bore which intersects said vertical bore, a pivot shaft supported within said vertical bore for rotation about a generally vertical axis, said pivot shaft having fixed thereto a pinion, and means for supporting said lower unit from said pivot shaft with said drive shaft being located in rearwardly spaced relation from said pivot shaft, a rack located in engagement with said pinion and supported within said horizontal cross bore to afford generally horizontal movement of said rack to effect rotation of said pinion and pivot shaft and said lower unit about said vertical axis, and steering control means for effecting horizontal movement of said rack so as to afford control of said rotation of said lower unit about said vertical axis, said rack and said steering control means being located below said generally horizontal axis.

4,041,890
INDEXING APPARATUS FOR A RECORD AND/OR PLAYBACK DEVICE

Leslie N. Wilder, Fairfield, and Anthony Ciaraldi, Huntington, both of Conn., assignors to Dictaphone Corporation, Rye, N.Y.

Filed Apr. 20, 1976, Ser. No. 678,705
Int. Cl.[2] G01D *18/00*
U.S. Cl. 116—114 R 10 Claims

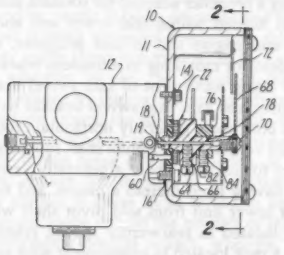


1. Indexing apparatus for providing an indication of the amount of record medium which has been driven past a predetermined position, comprising:
- a first carriage movable along a predetermined rectilinear path;
- driving means for bidirectionally driving said first carriage along said predetermined rectilinear path in synchronism with the relative movement of said record medium;
- a second carriage movable along said predetermined rectilinear path, said second carriage being moved when said first carriage is driven in one direction; and
- index means coupled to and movable with said second carriage for displaying at least a portion thereof representing said amount of record medium which has been driven past said predetermined position.

4,041,891
FLOW INDICATOR WITH IMPROVED BIASING ASSEMBLY

Nils O. Rosaen, Bloomfield Hills, Mich., assignor to Nancy Helen Rosaen, Ann Arbor, Mich., a part interest

Filed Mar. 22, 1976, Ser. No. 669,260
Int. Cl.[2] G01F *1/28*
U.S. Cl. 116—117 R 5 Claims

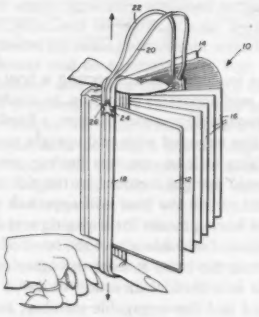


1. A fluid flow meter adapted to provide a visual indication of the fluid flow rate through said flow meter, said flow meter being of the type which imparts a rotation to a shaft in response to a variation in the flow rate through said flow meter, and biasing means for biasing said shaft in a rotational direction opposite to that produced by fluid flow through the flow meter, said biasing means further comprising a spring carrier, means for securing said spring carrier to said shaft, a coil spring secured at one end to said spring carrier and at its other end to a spring retainer shell, means for securing said retainer shell against rotation to said flow meter, removable locking means to secure said spring carrier against rotation to said retainer shell, and indicator means operatively secured to said spring carrier and adapted to provide a visual indication of the rotational position of said spring carrier, said removable locking means being removable from said spring carrier and said retainer shell after said spring carrier is secured to said shaft.

4,041,892
BOOK MARKER EMPLOYING ENDLESS ELASTIC BAND

Mary V. Nichols, 220 Cherrywood Gardens, Maitland, Fla. 32751

Filed Oct. 1, 1975, Ser. No. 618,439
Int. Cl.[2] B42D *9/00*
U.S. Cl. 116—119 5 Claims



1. A book marker for books of the type having front and back covers comprising:
- an endless elastic band for encircling one of said front and back covers;
- at least two marking strips stitched tangent to said elastic band at a point along said band for marking preselected pages of a book between said front and back covers;
- a stitch pad sewn over both said marking strips at said point; and
- means for changing the length of said marking strips, said length changing means comprising means for rotating said band around said cover.

4,041,893
MEDICAL REFERENCE CHART

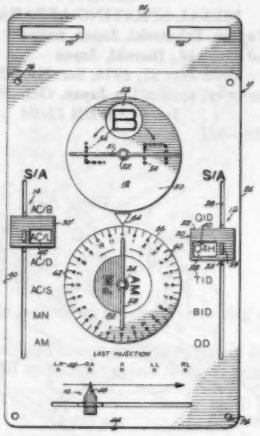
Edward B. Mulloy, 1434 Argyle Drive, Fort Myers, Fla. 33901

Filed Mar. 29, 1976, Ser. No. 671,327
Int. Cl.[2] G09F *9/00*
U.S. Cl. 116—131 2 Claims

1. A reference chart for use in hospitals and nursing homes or the like comprising,
- a relatively rigid sheet of any suitable material, generally rectangular in shape and including,
- a first indicator means for selective, manual operation to indicate the next procedure to be taken in the continuing care of a patient,
- a second indicator means for selective manual operation to indicate the performance of said procedure,
- a third indicator means for selective manual operation to indicate the portion of a patient's body to which said procedure was administered,
- said first, second and third indicator means being linear in form,
- a first rotary indicator means for selective, manual operation

to indicate the last position to which a patient was turned in bed,

said first rotary indicator means comprising a first disc, centrally pivoted to the upper, central portion of said sheet with a sight window therethrough, and



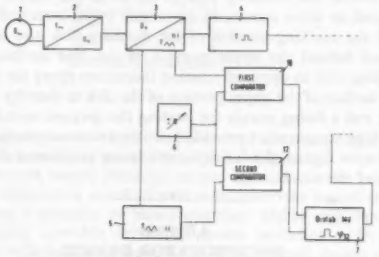
an outwardly extending finger grip portion for manual rotation thereof into selective registration with any one of a plurality of indicia markings applied to the face of said sheet.

4,041,894

ELECTRONIC ARRANGEMENT FOR GENERATING TWO ALTERNATING VOLTAGES WHOSE PHASES ARE SHIFTABLE

Klaus Kimmich, Stuttgart, Germany, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Aug. 26, 1976, Ser. No. 717,849
Claims priority, application Germany, Sept. 5, 1975, 2539498
Int. Cl.[2] B05C *5/02;* **H03K** *5/00*
U.S. Cl. 118—7 **3 Claims**



1. An elelctronic arrangement for generating from an input a.c. voltage variable in frequency at least two output a.c. voltages variable in frequency which are continuously shiftable in phase with respect to each other by a constant, frequency dependent angle $0 < \psi < 180°$, comprising:

means for changing said variable input a.c. voltage to a triangular voltage of constant amplitude proportional in frequency to the input a.c. voltage;

means for deriving a first square-wave voltage from said triangular voltage;

means for inverting said triangular voltage;

separate comparator means connected to said triangular voltage means and inverted triangular voltage means;

manually variable d.c. voltage generating means connected to a second input of each of said comparator means;

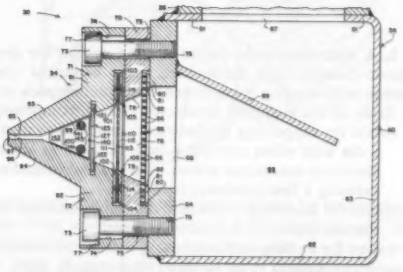
bistable multivibrator means connected to said comparators for generating a second square-wave voltage shiftable in phase by an angle ψ with respect to said first square-wave voltage by manually varying said d.c. voltage generating means.

4,041,895

COATING THICKNESS AND DISTRIBUTION CONTROL

Harold C. Overton, and Theodore L. Page, both of Gadsden, Ala., assignors to Republic Steel Corporation, Cleveland, Ohio

Filed Sept. 29, 1975, Ser. No. 617,742
Int. Cl.[2] B05C *11/06*
U.S. Cl. 118—7 **3 Claims**



1. An apparatus for screeding excess coating material from a substrate as the substrate moves along a feed path, comprising:

a. a nozzle positioned near the feed path and defining an elongated discharge opening oriented toward the feed path;

b. a conduit defining a passage of elongated cross-section extending substantially the full length of and communicating with the discharge opening for supplying pressurized fluid to and discharging pressurized fluid through the discharge opening toward the feed path;

c. flow regulating means for selectively regulating the rate of flow of fluid through portions of the conduit such that fluid discharging toward the feed path from the discharge opening has a predetermined nonuniform pressure profile along the length of the discharge opening that will cause all but a desired cross-sectional profile of coating material to be screeded from a substrate moving along the feed path past the nozzle, said flow regulating means including a shutter structure comprising an elongated member positionable across the conduit passage, said elongated member including at least one elongated opening which varies in width along its length, said opening defining a flow regulating formation for restricting fluid flow through the conduit passage, to a greater degree in some conduit portions than in other conduit portions; and

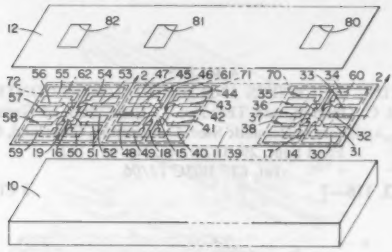
d. vane means positioned downstream from the flow regulating means and in the conduit passage for guiding fluid which passes through the flow regulating means for discharge through the discharge opening, said vane means including a plurality of vanes arranged in a longitudinally spaced array near selected portions of the discharge opening, each vane including a base portion and a distal portion, said base portion being substantially aligned with the direction of flow of pressurized fluid toward the substrate, said distal portion extending laterally from the downstream end of said base portion toward the direction of the substrate edge to which it is closer.

4,041,896

MICROELECTRONIC CIRCUIT COATING SYSTEM

Tuh-Kai Koo, Dayton, and Armand J. van Velthoven, West Carrollton, both of Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed May 12, 1975, Ser. No. 576,517
Int. Cl.² C23C *13/02*
U.S. Cl. 118—48 **20 Claims**



1. A microelectronic circuit coating system for depositing silicon dioxide on a die secured to an electrical conductor system with bonding wires connecting bonding pads on the die to leads on the electrical conductor system, comprising:

means for supporting an electrical conductor system having a die with wires extending from said die to leads on the electrical conductor system, said die and extending wires defining a first predetermined area,

means for directing a chemical deposition mixture onto said die and electrical conductor system,

means for heating said supporting means and electrical conductor system to an elevated temperature, and

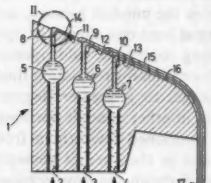
masking means positioned over said electrical conductor system and having an aperture corresponding to said first predetermined area and aligned therewith, whereby said masking means permits said deposition mixture to be deposited solely within said first predetermined area and prevents said deposition mixture from forming on said electrical conductor system in a second predetermined area outside said first predetermined area.

4,041,897

CASCADE COATER

Frank Ade, Fribourg, Switzerland, assignor to Ciba-Geigy AG, Basel, Switzerland

Filed May 10, 1976, Ser. No. 684,693
Claims priority, application Switzerland, May 14, 1975, 6195/75
Int. Cl.² B05C *5/00*
U.S. Cl. 118—300 **4 Claims**



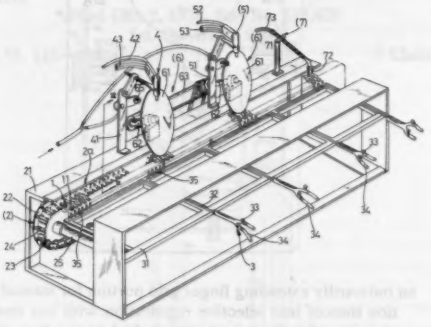
1. A cascade coater having at least one slideway and, extending thereinto, an associated feed slot having an upstream and a downstream boundary wall, the upstream boundary wall terminating in an edge parallel to the associated slideway, whereas the downstream boundary wall of the slot has a face between said boundary wall and the associated slideway at an angle of from approximately 100° to 170°, with the slideway and the face length as measured in a plane perpendicular to the slideway and to the downstream boundary wall being at least 0.5 mm and at most 5 mm.

4,041,898

METAL SPRAYING APPARATUS

Akiyoshi Tajima, Takatsuki, Japan, assignor to Osaka Welding Industrial Co., Ltd., Ibaraki, Japan

Filed July 27, 1976, Ser. No. 709,223
Claims priority, application Japan, Oct. 29, 1975, 50130729
Int. Cl.² B05B *15/04*
U.S. Cl. 118—301 **4 Claims**



1. A metal spraying apparatus comprising conveyor means for supporting and conveying works to be sprayed; preheating means disposed along the path of travel of the works for preheating the works from below; a plurality of metal spray nozzles arranged above and along the path of travel of the works for spraying melted metal powder onto the desired surface of each of the works to be treated to form a metal layer thereon; masking means for exposing the desired surface of the works and shielding the other portions of the works from the spray nozzle, the masking means including a masking disk disposed at the spraying position and so inclined that the lower portion thereof is positioned close to the path of travel of the works to expose the desired work surface and shield the other portion of the works, the masking disk being rotatably supported and coupled to drive means; an air nozzle being arranged remote from the masking portion of the masking disk and being arranged behind the upper portion of the rear surface of the masking disk in opposed relation thereto to spray air onto the rear surface of the upper portion of the disk to thereby cool the disk; and a fusing nozzle for heating the sprayed metal surface to a high temperature provided at a downstream portion of the conveyor means, the fusing nozzle being positioned above the path of the works.

4,041,899

RECIPROCATOR DEVICE

Eugene Earl Wolfe, and Allan Burkett Heath, both of Port Huron, Mich., assignors to Acheson Industries, Inc., Port Huron, Mich.

Filed June 17, 1976, Ser. No. 694,101
Int. Cl.² B05B *3/18;* F16H *21/02*
U.S. Cl. 118—323 **28 Claims**

1. A reciprocating device adapted to longitudinally reciprocate a spray head across a surface comprising:

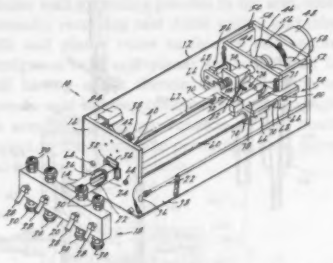
a supporting structure;

a reversible driving means having a driving shaft extending outward therefrom adapted to be rotationally driven by said driving means, said driving means being secured to said supporting structure;

a carriage assembly;

an elongated member having one end thereof removably secured to said carriage assembly;

means connecting said carriage assembly to said driving shaft so as to cause said carriage assembly and said elongated member to be lineally reciprocated in a longitudinal direction in response to said rotation of said driving shaft;



spray head means secured to another end of said elongated member; and,

feed line means secured to said spray head means for supplying fluids to said spray head means from a supply source.

4,041,900

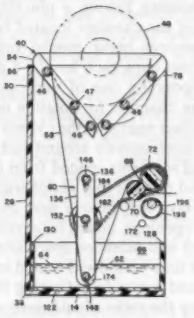
PIVOTED GUIDE MEANS FOR SELECTIVE IMMERSION OF WEB FEED

James H. Charles, 2506 Blount Ave., Maryville, Tenn. 37801

Filed Apr. 30, 1976, Ser. No. 681,778

Int. Cl.² B05C *3/12*

U.S. Cl. 118—419 **3 Claims**



1. An apparatus for dispensing a web of absorbent material selectively in a dry or wetted condition comprising:

frame means, means mounted on said frame means for rotatably supporting a roll of said web, reservoir means containing a quantity of liquid disposed within said frame, manually operable drive roll means including a set of drive rolls mounted for rotation in said frame means and defining a nip therebetween through which said web is threaded, said drive rolls positively engaging said web threaded through said nip whereby forward rotation of said drive rolls draws said web from said roll and dispenses the same outwardly from said frame means, guide means mounted in said frame means for guiding said web along a path including a section spaced from said liquid and movable to a position for guiding said web into contact with said liquid in said reservoir, drive means including clutch means interconnecting said drive roll means and said guide means for movement of said guide means between a position for guiding said web into contact with said liquid upon reverse rotation of said drive roll means and a position for guiding said web along said section of said path spaced from said liquid upon forward rotation of said drive roll means.

4,041,901

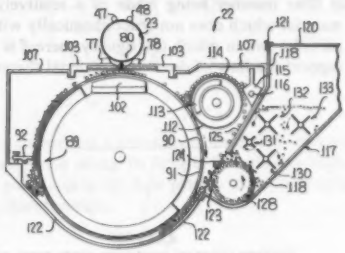
APPARATUS FOR ELECTROSTATIC PRINTING OR COATING AND DEVELOPER MIX CIRCULATING SYSTEM

Kenneth W. Rarey, South Holland; Edward D. Higgins, Palos Heights; Donald L. Hungerford, and John B. Kennedy, Jr., both of Chicago, all of Ill., assignors to Continental Can Co., Inc., Chicago, Ill.

Continuation of Ser. No. 791,098, Jan. 14, 1969, abandoned. This application Feb. 22, 1974, Ser. No. 445,289

Int. Cl.² B05B *5/ 9*

U.S. Cl. 118—621 **31 Claims**



1. Electrostatic printing or coating apparatus for electrostatically depositing toner on portions of continuously conveyed articles comprising means for conveying articles along a predetermined path of travel through a toner application zone, means for transporting toner through said toner application zone, means for electrostatically propelling said toner in said toner application zone from said transporting means to articles conveyed along said path of travel, means defining an elongated narrow opening in said toner application zone between said transporting means and said conveying means whereby only the propelled toner passing through said opening is deposited upon said articles, the longitudinal axis of said opening is disposed in generally parallel relationship to said path of travel, said transporting means includes an endless moving surface upon which is supported said toner, and a portion of said endless moving surface is disposed adjacent said narrow opening and moves past said narrow opening in a direction transverse to the longitudinal axis thereof.

4,041,902

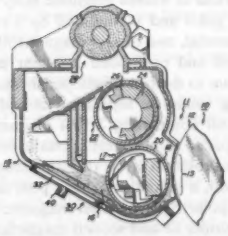
FILTER APPARATUS

Don B. Jugle, Penfield, and Anthony F. Lipani, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed May 11, 1976, Ser. No. 685,217

Int. Cl.² G03G *15/08*

U.S. Cl. 118—653 **5 Claims**



1. An improved filter apparatus for use in controlling the

emission of airborne toner particles from a developer housing comprising

a housing at least partially open to the atmosphere containing developer material including toner particles and relatively larger carrier particles,

a foraminous filter member having pore openings of size ranging from about 20 microns to about 100 microns positioned in an opening formed in the bottom of said housing at an acute angle inclined below the horizontal,

seal means for securing said filter member within the opening of said housing so that said filter member is flush therewith in the flow path of the developer material,

means for connecting a source of negative pressure to said seal means to cause any airborne toner particles to flow across the flow path of the developer material towards said filter member,

said filter member being made of a relatively rigid inert material which does not react chemically with said toner particles and in which the rigidity thereof is sufficient to support the flow of developer material thereacross.

4,041,903

DEVELOPING DEVICE FOR USE IN ELECTROPHOTOGRAPHY

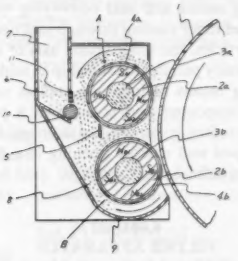
Hiroshi Katakura, Hachioji, and Keitaro Yamashita, Kamisato, both of Japan, assignors to Konishiroku Photo Industry Co., Ltd. and Hitachi Metals, Ltd., both of Tokyo, Japan

Division of Ser. No. 578,266, May 16, 1975, Pat. No. 4,008,686. This application Dec. 15, 1976, Ser. No. 750,768

Claims priority, application Japan, May 21, 1974, 49-56864

Int. Cl.[2] B05B *5/02*

U.S. Cl. 118—658 **4 Claims**



1. In an electrostatic latent image developing device having a pair of spaced magnet rolls for delivery of developer from a developer storage chamber to the latent image bearing surface of an electrostatic recording medium, and wherein each magnet roll is comprised of a fixed magnetic body having a plurality of magnetic poles and surrounded by a rotatable tube of nonmagnetic material, one of said magnet rolls being a developer magnet roll and positioned adjacent said electrostatic recording medium to deposit developer thereon, the improvement comprising: means for separating unused developer from the developer roll comprising a first magnetic pole on said developer roll spaced from the electrostatic recording medium in the direction of rotation of the rotatable tube associated with the developer roll, a second magnetic pole on the other side roll opposite in polarity to said first magnetic pole for attracting unused developer to said second magnetic pole, said other magnetic roll being in position to deliver the unused, separated developer to a housing compartment.

4,041,904

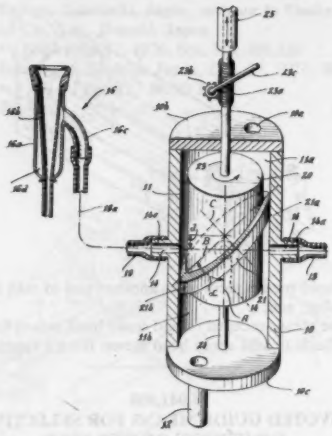
PNEUMATIC PULSATOR FOR TEAT CUPS

Denis C. Yang, Irvington, N.Y., assignor to The De Laval Separator Company, Poughkeepsie, N.Y.

Filed May 14, 1976, Ser. No. 686,654

Int. Cl.[2] A01J *5/10*

U.S. Cl. 119—14.41 **7 Claims**



1. In combination with a plurality of teat cups, a pneumatic pulsator comprising a housing forming a cylindrical chamber having a central axis, said chamber having upper and lower end portions maintained, respectively, at a high pressure and at a low pressure, the housing having a plurality of openings leading from a region of the chamber located between its said end portions, said openings being spaced from each other around said axis, said teat cups each having a pulsation space connected to a corresponding one of said openings, a rotor mounted in the housing chamber for rotation on said axis and having a peripheral surface engaging the cylindrical wall of the chamber substantially continuously around said axis, the rotor having first and second segments spaced from each other and forming first and second parts of said peripheral surface which are located, respectively, only above and only below said region of the chamber openings, means for driving the rotor on said axis to subject each said pulsation space alternately to said high pressure for a first time period and to said low pressure for a second time period, and means for adjusting the rotor axially in said chamber to vary the ratio of said time periods.

4,041,905

ANIMAL GROOMING APPARATUS HAVING IMPROVED TETHERING DEVICE

Charles H. Prager, 6105 N. 116th St., Milwaukee, Wis. 53225, and John J. Seller, 10414 E. Jefferson Road, Osecola, Ind. 46561

Filed Nov. 19, 1975, Ser. No. 633,551

Int. Cl.[2] A01K *29/00*

U.S. Cl. 119—103 **5 Claims**

1. In apparatus for grooming animals having a grooming post arm with an end terminating above a raised work surface, an improved tethering device comprising:

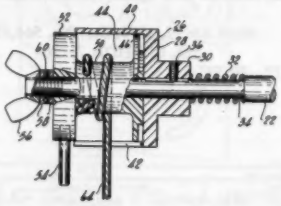
a tether formed of a cord having means at one end suitable for use in restraining the animal; and

a tether control mounted on the arm, said tether control including;

a drum rotatably mounted on the arm so that the arm serves as an axle, said drum having first and second axially spaced flanges lying normal to the drum, said first flange being located adjacent the end of said arm, said second flange being spaced inwardly along the arm

from the end and having an exposed planar outer surface, said cord being wrapped and unwrapped on said drum between said flanges for storing and paying out purposes,

a generally cup-shaped housing mounted on the arm beyond said second flange, said housing having a base through which the arm extends and presenting a planar surface normal to the arm, said housing including a tubular wall extending parallel to the arm, said housing internally receiving said drum within said tubular wall with said planar outer surface of said second flange contiguous with said planar surface of said base, said wall having a slot therein through which said cord extends, said housing containing means engagable with the arm for restraining rotation of said housing with respect to the arm while permitting axial movement of said housing along the arm,



resilient means mounted on said arm exteriorly of, and beyond, said housing and bearing on said housing for urging said housing and drum toward the end of the arm, and

means mounted on the end of the arm and engaging said first flange of said drum for moving said drum and housing along the arm away from the end in opposition to the urging of said resilient means for establishing an engagement of the surfaces of said second flange and said housing, said engagement establishing the amount of frictional resistance to rotation exerted by said housing on said drum, said resistance being sufficient to prevent movement of said drum responsive to normal movements of the animal on the raised work surface, but permitting movement of the animal responsive to the weight of the animal falling off the raised work surface for paying out said cord.

4,041,906

ENERGY SYSTEM PRODUCING ELECTRICITY, HOT WATER AND STEAM FROM COMBUSTIBLE REFUSE

Raymond S. Edwards, 4367 N. Miller Road, Scottsdale, Ariz. 85251

Filed Apr. 14, 1976, Ser. No. 677,073
Int. Cl.[2] F22B *33/00, 31/00*
U.S. Cl. 122—2 **3 Claims**

1. A refuse burner, energy generating system comprising in combination:

a pulse-jet sonic burner,

an inlet port for the introduction of refuse into said burner,

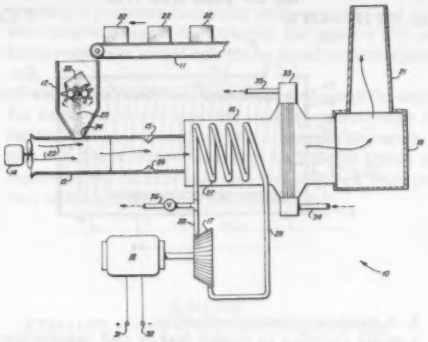
a pulverizer for feeding small particles of refuse through said inlet port into said burner,

means coaxially arranged with said burner for driving air and refuse introduced through said inlet port under pressure into and through said burner,

a steam generator comprising a coil of fluid conducting tubing coaxially arranged with said burner within the path of movement of the driven air and refuse for receiving the burning gases of said burner for heating fluid in said tubing,

a water jacket surrounding said generator in heat conductive relationship therewith for conducting water therethrough for heating by the burning gases passing through said generator, and

a precipitator connected to said generator for removing the smoke and pollutant matters emitted by said generator prior to exhaustion to atmosphere,



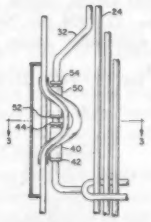
said burner comprising a generally cylindrical form employing a restriction along its length for creating high frequency pulsations in the flow pattern of the burning gases passing therethrough.

4,041,907

SPACER ARRANGEMENT FOR STEAM GENERATOR

Norman Chanine Chayes, Bloomfield, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Aug. 2, 1976, Ser. No. 710,485
Int. Cl.[2] F22B *37/24*
U.S. Cl. 122—510 **7 Claims**



1. A spacer tube arrangement for a steam generator having, a furnace, vertical tubes forming a planular wall of said furnace, and a tubular superheater pendant unit supported from an upper elevation and forming a plane transverse to the plane of the wall, comprising:

a. a pair of said vertical tubes bumped into the furnace at a restraining elevation area;

b. fluid cooled spacer tubes passing horizontally parallel to the plane of said pendant units in closely spaced relationship therewith and on each side thereof at a lower elevation below said restraining elevation;

c. a vertical fluid cooled tubular means in series fluid flow relationship with said spacer tubes and passing vertically between said pair of vertical tubes; and

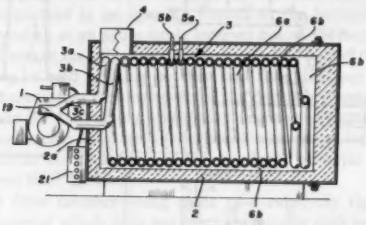
d. a freely rotatable sleeve surrounding said vertical fluid cooled tubular means at said restraining elevation area.

4,041,908

SUPER HEATER

Edward Rasinski, Hopkins, Minn., assignor to Moorhead Machinery & Boiler Co., Minneapolis, Minn.

Filed Jan. 22, 1976, Ser. No. 651,603
Int. Cl.[2] F22G *5/00, 7/08*
U.S. Cl. 122—479 R **7 Claims**



1. A steam superheater comprising,

a casing including an outside firebox wall construction

a hollow steam coil system to define therewithin a central radiant "black body" type heat transfer chamber and mounted within said casing with the outer surfaces of said coil system spaced slightly inwardly from the inside surfaces of the casing wall to provide a convection heat transfer passage around one end and the outside of said coil system,

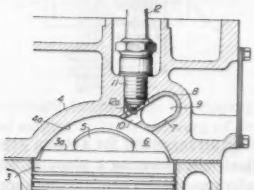
said coil system consisting of a double helical coil unit having the convolutions of the two coils disposed in longitudinally adjacent side by side contact relation to produce coil chamber having the side wall thereof only the thickness of the diameter of a single coil tube to double the steam flow capacity thereof while maintaining the same surface area of contact with the products of combustion from said heat source for both coils.

4,041,909

INTERNAL-COMBUSTION ENGINE HAVING A SUB-COMBUSTION CHAMBER

Norihiko Nakamura, Mishima, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Dec. 12, 1974, Ser. No. 532,224
Claims priority, application Japan, Sept. 24, 1974, 49-115501[U]
Int. Cl.[2] F02B *23/00*
U.S. Cl. 123—32 SP **3 Claims**



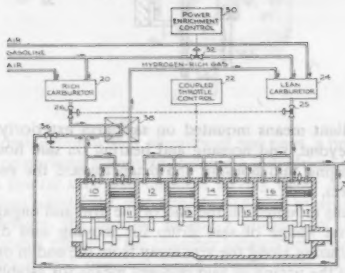
1. An internal-combustion engine comprising a cylinder, a cylinder head having a recess opening to the inner surface thereof, a piston for sliding movement within said cylinder, a main combustion chamber being defined between the inner surface of said cylinder head and the top surface of said piston and having an intake valve for admitting the lean air-fuel mixture thereinto and an exhaust valve for discharging the exhaust gas therefrom, a sub-chamber element fitted into said recess of the cylinder head in overall close contact relation with and securely held in position under contact pressure against said recess and formed therein with a sub-chamber and a passage which intercommunicate said sub-chamber and said main combustion chamber for providing the only supply of air-fuel mixture for said sub-chamber in which the coefficient of thermal expansion of said cylinder head is 1.5 to 2.5 times that of said sub-chamber element, thereby preventing said sub-chamber element from dropping into said main combustion chamber, and a spark plug having a sparking gap for exposing said gap to said passage.

4,041,910

COMBUSTION ENGINE

John Houseman, Pasadena, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Apr. 2, 1975, Ser. No. 564,622
Int. Cl.[2] F02B *75/20*
U.S. Cl. 123—59 EC **5 Claims**



1. In an internal combustion engine of the type that has a plurality of cylinders each cylinder having a reciprocating piston, an intake means for enabling the timed introduction of fuel within each of said cylinders, an exhaust means for enabling the timed exhausting of the contents of each of said cylinders, and spark plug means for igniting fuel within each said cylinders, the improvement comprising

rich carburetor means for forming a first mixture of a hydrocarbon fuel with only enough air to partially oxidize said hydrocarbon fuel when ignited,

first means for introducing said first mixture into one of said cylinders from said rich carburetor means through its intake means to be compressed and ignited by operation of said internal combustion engine whereby hydrogen rich gases are formed in said one of said cylinders, said first means including first valve means for determining the amount of said first mixture introduced into said one of said cylinders,

lean carburetor means for forming a second mixture of hydrogen rich gases and enough air to fully oxidize said hydrogen rich gases,

means for transferring hydrogen rich gases from said one of said cylinders to said lean carburetor means,

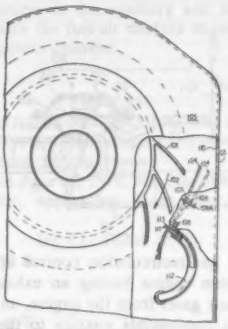
second means for introducing said second mixture into the remaining cylinders of said engine through their intake means for use as a fuel, said second means including a second valve means for determining the amount of said second mixture introduced into the remaining cylinders of said engine, and

a throttle control means coupled to both said valve means for simultaneously controlling the respective amounts of first and second mixtures passed by both said valve means.

4,041,911
CARBURETTORS AND ASSOCIATED COMPONENTS

William Henry Steele, 3 Taft Place, Bonnet Bay, New South Wales 2226, and George Nejtek, 78 Townsend St., Condell Park, New South Wales 2200, both of Australia

Division of Ser. No. 398,800, Sept. 19, 1973, Pat. No. 3,939,231.
This application May 7, 1975, Ser. No. 575,396
Claims priority, application Australia, Sept. 20, 1972, 507/72
Int. Cl.[2] F02D *11/08*
U.S. Cl. 123—103 B 7 Claims

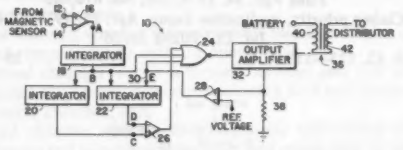


1. Apparatus for controlling a function of an engine in response to engine speed comprising a fluid pressure-operated means operable to control said function, an air impeller on the engine motivated by a drive shaft of the engine, a cowling at least partly enclosing said air impeller, an aerofoil surface on a vane movably mounted upon said cowling to adjust its position in the path of air flow from said impeller and fluid passage means having a terminal orifice connected to and positioned relative to said surface so as to be exposed to an air pressure that varies with changes in engine speed, and a fluid line connecting said fluid passage means with the fluid pressure-operated member.

4,041,912
SOLID-STATE IGNITION SYSTEM AND METHOD FOR LINEARLY REGULATING AND DWELL TIME THEREOF

Douglas Charles Sessions, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 25, 1975, Ser. No. 607,402
Int. Cl.[2] F02P *1/00*
U.S. Cl. 123—117 R 7 Claims



1. An ignition system for an internal combustion engine which is responsive to alternating ignition signals generated in timed relationship with the engine and which includes an amplifier switching circuit for charging and discharging an ignition coil, comprising in combination:

first circuit means responsive to each successive generated ignition signal for producing a monopulse output signal and a reference output signal comprising dual constant slopes, said monopulse signal being produced during a predetermined portion of a half cycle of the ignition signal, the first constant slope portion of said reference output signal being produced simultaneously with said monopulse output signal, the second constant slope portion of said reference output signal being produced during the remainder of the duration of the ignition signal;

second circuit means responsive to said monopulse signal for producing a variable threshold signal;

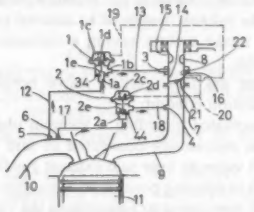
the amplifier switching circuit being responsive to the magnitude of said second slope portion of said reference signal reaching a predetermined value with respect to said variable threshold signal for charging the ignition coil and being responsive to said monopulse signal to discharge the coil;

feedback means responsive to the current through the amplifier switching circuit reaching a predetermined value for limiting the same thereat and for causing the magnitude of said variable threshold signal to be linearly varied for regulating the current limit duty cycle to be a fixed percent of the ignition signal time period.

4,041,913
EXHAUST GAS RECIRCULATING SYSTEM

Hidetaka Nohira, Susono, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyoda, Japan

Filed Aug. 29, 1975, Ser. No. 608,975
Claims priority, application Japan, Feb. 22, 1975, 50-22038
Int. Cl.[2] F02B *33/00*; F02M *7/00*
U.S. Cl. 123—119 A 8 Claims



1. An exhaust gas recirculating system for use in an internal combustion engine of a motor vehicle, comprising:

first and second flow rate control valves, in which the interior of each of said valve is sealingly divided by means of a single diaphragm into one diaphragm chamber and a single valve chamber having one inlet and one outlet, a valve stem having a root portion with a valve body at its top secured to said diaphragm, said valve body being adapted to open and close each of said valves according to the motion of said diaphragm;

a pipe communicating the inlet of said first flow rate control valve with the exhaust system of said engine;

a pipe communicating the outlet of said first valve with the intake system of said engine in a position upstream of a throttle valve of said engine;

a negative-pressure pipe communicating the diaphragm chamber of said first flow rate control valve with said intake system of said engine in a position slightly upstream of the idle position of said throttle valve;

a pipe communicating the inlet of said second flow rate control valve with said exhaust system of said engine;

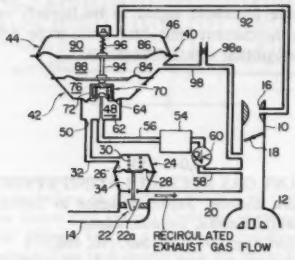
a pipe communicating the outlet of said second flow rate control valve with said intake system of said engine in a position downstream of said throttle valve of said engine; and

a pipe communicating said diaphragm chamber of said second flow rate control valve with said intake system of said engine in a position slightly upstream of the point where the first flow rate control valve is communicated with said intake system.

4,041,914
EXHAUST GAS RECIRCULATION SYSTEM WITH CONTROL APPARATUS FOR EXHAUST GAS FLOW CONTROL VALVE

Kunihiko Sugihara, Yokohama; Yasuo Nakajima, Yokosuka, and Yoshimasa Hayashi, Yokohama, all of Japan, assignors to Nissan Motor Company, Limited, Japan

Filed June 19, 1975, Ser. No. 588,238
Claims priority, application Japan, June 25, 1974, 49-72460
Int. Cl.[2] F02M *25/06*
U.S. Cl. 123—119 A 4 Claims



1. An exhaust gas recirculation system comprising:

a recirculation conduit to recirculate a portion of exhaust gas from the exhaust system of an internal combustion engine to the intake system having a carburetor and an intake manifold;

an exhaust gas flow control valve normally closing said recirculation conduit;

a valve actuator including a vacuum chamber and a diaphragm operatively connected to said exhaust gas flow control valve to urge said exhaust gas flow control valve toward its opening position so as to open said recirculation conduit responsive to a vacuum in the vacuum chamber of said valve actuator; and

a control apparatus comprising:

a housing having a vacuum regulating chamber, said vacuum regulating chamber having an inlet port connected to the vacuum chamber of said valve actuator, an air bleed port and an outlet port connected to a vacuum reservoir;

a first flexible diaphragm defining a wall of said vacuum regulating chamber;

a second flexible diaphragm cooperating with said first diaphragm means to form in said housing and between said first and second diaphragms an atmospheric pressure chamber;

a third flexible diaphragm cooperating with said second diaphragm means to form in said housing and between said second and third diaphragms a biasing chamber, said third flexible diaphragm forming on the opposite side of a side exposed to said biasing chamber and in said housing a venturi vacuum chamber communicating with the venturi of the carburetor;

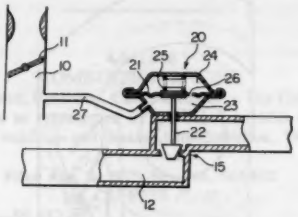
interconnecting means for mechanically interconnecting said first, second and third diaphragms, said interconnecting means including a valve means for selectively closing the air bleed port and said outlet port in response to deflections of said first, second and third diaphragms, and a vacuum conduit connecting said biasing chamber with the intake manifold;

an effective area of said third diaphragm being larger than that of said first diaphragm and than that of said second diaphragm, and said vacuum conduit including an air bleeder orifice having a restriction chosen such that a vacuum in said biasing means is a reduction of the intake manifold vacuum.

4,041,915
APPARATUS TO CONTROL THE RECIRCULATION OF EXHAUST GASES INTO THE INTAKE PASSAGE IN AN INTERNAL COMBUSTION ENGINE

Hideki Konishi, Tokyo, Japan, assignor to Nissan Motor Company Limited, Yokohama City, Japan

Filed Jan. 12, 1976, Ser. No. 648,139
Claims priority, application Japan, Jan. 14, 1975, 50-5976
Int. Cl.[2] F02M *25/06*
U.S. Cl. 123—119 A 5 Claims

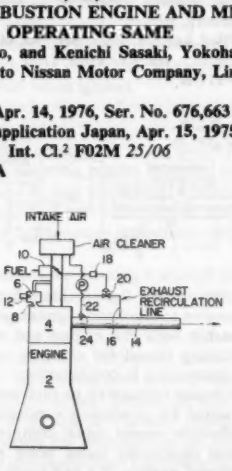


1. An exhaust gas recirculation control apparatus for an internal combustion engine having an exhaust passage for conducting exhaust gases from the engine, an intake passage for conducting a combustible mixture to the engine and a throttle valve in the intake passage, comprising a connecting passageway connecting the exhaust passage to the intake passage, valve means for controlling the flow of exhaust gases through the connecting passageway, a suction responsive motor having a diaphragm connected to said valve means, a first pressure chamber communicating with the intake passage downstream of the throttle valve, a second pressure chamber, the diaphragm being between said two pressure chambers, said diaphragm being preloaded by a spring to close said valve means and acted upon by the pressure difference between the pressures in the two chambers to hold the valve means in an open position when the differential pressure across the diaphragm increases at a predetermined rate with respect to time and means to provide a limited fluid communication between the two pressure chambers.

4,041,916
INTERNAL COMBUSTION ENGINE AND METHOD OF OPERATING SAME

Hiroshi Iida, Tokyo, and Kenichi Sasaki, Yokohama, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Apr. 14, 1976, Ser. No. 676,663
Claims priority, application Japan, Apr. 15, 1975, 50-45553
Int. Cl.[2] F02M *25/06*
U.S. Cl. 123—119 A 20 Claims



1. A method for operating a spark ignition internal combustion engine having an auxiliary combustion chamber connected to a main combustion chamber by a torch flame passage

and means for igniting a fuel-air mixture in the auxiliary combustion chamber, comprising:

passing a fuel-air mixture into the auxiliary combustion chamber;

passing the fuel-air mixture into the main combustion chamber;

igniting the fuel-air mixture in the auxiliary combustion chamber for igniting the fuel-air mixture in the main combustion chamber; and

mixing the exhaust gas resulting from the combustion of the fuel-air mixtures in the auxiliary and main combustion chambers with the fuel-air mixture to be passed into the main combustion chamber.

4,041,917

EXHAUST GAS RECIRCULATION SYSTEM

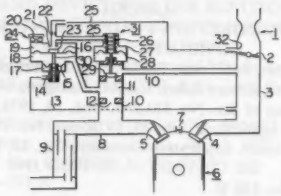
Yukio Suzuki, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed June 21, 1976, Ser. No. 699,038

Claims priority, application Japan, Apr. 19, 1976, 51-47891[U]

Int. Cl.² F02M *25/06*

U.S. Cl. 123—119 A **3 Claims**



1. An exhaust gas recirculation system comprising:

a diaphragm type EGR valve mounted on an EGR pipe which connects the exhaust pipe with the intake pipe of the engine;

a pressure control chamber formed at the inlet of said EGR valve;

an orifice mounted on a communicating pipe which connects the diaphragm chamber of said EGR valve with the EGR port arranged near the throttle valve of the carburetor;

a relief pipe diverging from said communicating pipe between said orifice and said EGR valve, and;

a vacuum control valve mounted at the opening end of said relief pipe,

wherein said vacuum control valve comprises:

a first diaphragm;

a second diaphragm;

a first chamber which is formed outside said first diaphragm and communicating with the atmosphere;

a second chamber which is formed between said first and second diaphragms and communicating with said pressure control chamber, and;

a third chamber which is formed outside said second diaphragm and communicating with said intake pipe of said engine at the downstream of said throttle valve of said carburetor.

4,041,918

FUEL INJECTION SYSTEM

Jean-Pierre Rivere, Paris, France, assignor to Regie Nationale des Usines Renault, Boulogne-Billancourt and Automobiles Peugeot, Paris, both of, France

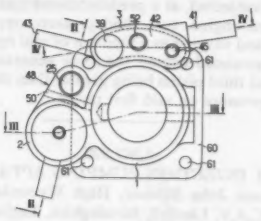
Filed Dec. 4, 1975, Ser. No. 637,629

Claims priority, application France, Dec. 13, 1974, 74.41170

Int. Cl.² F02M *69/00*

U.S. Cl. 123—139 AW **10 Claims**

1. A compact fuel feed system for fuel-injected internal combustion engines, comprising a throttle butterfly housing incorporating all the essential auxiliaries in combination with an inlet manifold thus avoiding the use of independent casings, in which an engine air supply unit comprises the throttle butterfly body which has at least two bosses, a first one of which is to be fed with engine coolant; the second boss comprising an annular recess incorporating a fuel pressure regulator, a bore accepting a decelerating air bypass for treatment of unburnt



hydrocarbons during the deceleration phase and including adjustment means for enabling the engine idling speed to be adjusted, and a boss accepting a cold start injector; said first boss comprising a first bore accepting a cold start injector air bypass, a second bore accepting a thermostat for measuring engine temperature and designed to ensure enrichment when the engine is started, and a third bore accepting an anti-overchoking thermostat for controlling the cold start injector.

4,041,919

FUEL INJECTION PUMP FOR INTERNAL COMBUSTION ENGINES, IN PARTICULAR FOR DIESEL ENGINES

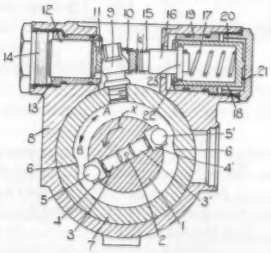
Jean Claude Bonin, Blois, France, assignor to Roto Diesel, Blois, France

Filed Jan. 19, 1976, Ser. No. 650,447

Claims priority, application France, Jan. 31, 1975, 75.03094

Int. Cl.² F02M *39/00*

U.S. Cl. 123—139 P **5 Claims**



1. A fuel injection pump for internal combustion engines, particularly diesel engines, of the type comprising a rotor with a diametral bore within which two opposing pistons slide freely, the inward stroke of the pistons being controlled by a predetermined cam profile defined on a cam-ring engageable with rollers supported by roller carriers slidable within the diametral bore in a radial direction and respectively in contact with outer ends of said pistons, a space between the two pistons being connected by means of an axial duct in the rotor, on the one hand to fuel inlet ducts and on the other hand, to a delivery duct which is successively connected during the rotation of the rotor with an injector of the associated engine, the pump comprising a housing; a first piston slidable within a bore in said housing, the said first piston being connected to said cam-ring in such a manner as to transmit angular movement thereto during movement of the first piston; means for supplying fluid pressure to said bore to one end of the first piston which fluid

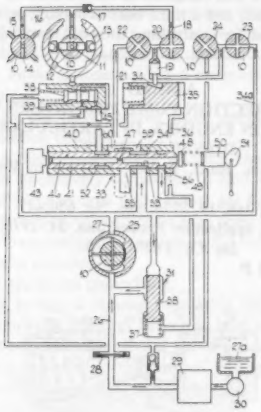
pressure is a function of an operating parameter of the associated engine; a second piston slidable in said housing; a first compression spring located between the other end of said first piston and one end of said second piston; a main advance spring positioned within said housing at the other end of said second piston, said second piston being subject to the reaction of said main advance spring acting against said first spring, a third piston slidable in said housing; the said main spring bearing against said third piston; and means allowing said third piston to be subjected, at a predetermined rotational speed of the associated engine, to a fluid pressure opposing the said main spring and varying as a function of said operating parameter of the associated engine, the force generated by the pressure upon said third piston being greater than the force exerted by the first pressure on said first piston.

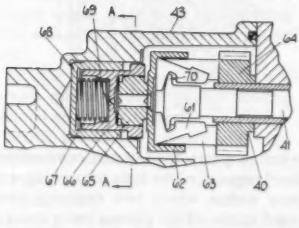
4,041,920

FUEL INJECTION PUMPING APPARATUS

Robert Thomas John Skinner, High Wycombe, England, assignor to C.A.V. Limited, Birmingham, England

Continuation of Ser. No. 598,129, July 22, 1975, abandoned.
This application Sept. 13, 1976, Ser. No. 722,403
Claims priority, application United Kingdom, July 26, 1974, 33029/74
Int. Cl.[2] F02D *1/02*
U.S. Cl. 123—139 AM **4 Claims**





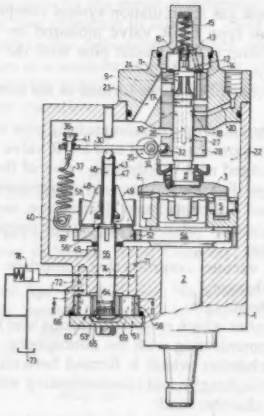
1. In a fuel injection pumping device having an injection pump for supplying fuel to an internal combustion engine, a feed pump for supplying fuel to said injection pump, a metering device between said fuel pump and said injection pump including a body, an axially movable control member within said body for controlling the amount of fuel supplied to said injection pump, a first biasing means at one end of said control member for urging said control member axially to increase the amount of fuel to said injection pump, and centrifugal weight means at the other end of said control member and rotatable as a function of the speed of the engine to exert a force opposing the force of said first biasing means to restrict movement of said control member by said first biasing means and means operable for increasing the force exerted by said first biasing means to move said control member against said centrifugal weight means to increase the supply of fuel to said injection pump, the improvement of a dash pot means for retarding sudden movement of said control member when the force exerted by said biasing means is increased by said operable means against said centrifugal weight means and comprising cage means engaging said centrifugal weight means and movable coaxially of said control member, means for rotating said cage means at a speed proportional to the speed of the engine, movable abutment means engaging said cage means and a second biasing means urging said abutment means against said cage means for opposing the force of said first biasing means, said body being provided with a fluid filled recess housing said cage means, said abutment means and said second biasing means, said abutment means dividing said recess into two chambers and being provided with a restricted aperture for communication of the fluid therethrough between said two chambers whereby when the force of said first biasing means is increased by said operable means, the movement of said control member is retarded by the dash pot means so that an excessive increase of fuel to the engine is temporarily prevented.

4,041,921

FUEL INJECTION PUMP FOR INTERNAL COMBUSTION ENGINES

Konrad Eckert, and Franz Eheim, both of Stuttgart, Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Continuation of Ser. No. 531,293, Dec. 10, 1974, abandoned.
This application July 27, 1976, Ser. No. 709,071
Claims priority, application Germany, Dec. 13, 1973, 2361958
Int. Cl.[2] F02M *39/00*; F02D *1/04*
U.S. Cl. 123—140 R **4 Claims**



1. In a fuel injection pump for internal combustion engines which includes a housing, a primary drive shaft disposed to rotate in said housing, cylinder means disposed within said housing, a reciprocating and rotating pump piston moving within said cylinder means and powered by said primary drive shaft, a centrifugal force governor for regulating the injected fuel quantity, and a fuel supply pump for supplying fuel to said cylinder means for delivery by said pump piston, the improvement comprising:

a secondary shaft, disposed to rotate within said housing and driven mediately by said primary drive shaft for simultaneously powering the motion of said centrifugal force governor and said fuel supply pump; and cover means, wherein:

i. said housing has an interior recess which together with

said cover means define an enclosure within which said fuel supply pump is mounted, said fuel supply pump including a central movable member;

ii. the central movable member of said fuel supply pump is coaxially disposed on one end of said secondary drive shaft;

iii. said secondary shaft comprises an upper portion and a lower portion with said lower portion having a larger diameter than said upper portion;

iv. said primary shaft includes drive imparting means; and

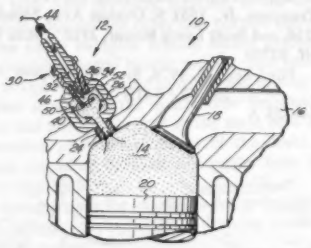
v. said lower portion has a drive receiving means mounted thereto which engages the drive imparting means of said primary shaft for driving said secondary shaft, and a drive imparting means mounted thereto which engages and imparts a drive to said central movable member of said fuel supply pump.

4,041,922

SYSTEM AND DEVICE FOR THE IGNITION OF AN INTERNAL COMBUSTION ENGINE USING A LEAN AIR-FUEL MIXTURE

Michio Abe, Kasugai Aichi, and Naoyuki Maeda, Inuyama, both of Japan, assignors to Tokai TRW & Co. Ltd., Kasugai Aichi, Japan

Filed June 30, 1975, Ser. No. 591,452
Claims priority, application Japan, July 8, 1974, 49-078008
Int. Cl.[2] F02B *23/00*; F02P *1/00*
U.S. Cl. 123—191 S **17 Claims**



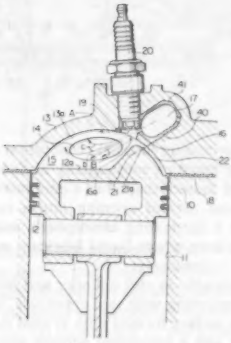
1. An engine comprising wall means for at least partially defining a main combustion chamber for receiving a relatively leans air-fuel mixture and an auxiliary combustion chamber which is connected in fluid communication with said main combustion chamber, said wall means including means for defining an opening through which the lean air-fuel mixture from said main combustion chamber can flow into said auxiliary combustion chamber, a spark plug connected with said wall means for igniting an air-fuel mixture in said auxiliary combustion chamber during operation of the engine, said spark plug including first and second electrodes exposed to the interior of said auxiliary combustion chamber and at least partially defining a path along which an electric arc passes to ignite an air-fuel mixture in said auxiliary combustion chamber, and means for establishing a corona discharge in said auxiliary combustion chamber to promote the accumulation of a relatively rich air-fuel mixture adjacent to said first and second electrodes, said means for establishing a corona discharge including a third electrode spaced apart from and disposed within said auxiliary combustion chamber and means for establishing between said first and third electrodes an electrical potential sufficient to cause a corona discharge.

4,041,923

INTERNAL COMBUSTION ENGINE OF LEAN AIR-FUEL MIXTURE COMBUSTION TYPE

Masami Konishi, Toyota, and Eishi Oono, Susono, both of Japan, assignors to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed June 28, 1976, Ser. No. 700,498
Claims priority, application Japan, May 14, 1976, 51-054250
Int. Cl.[2] F02B *23/00, 3/00*
U.S. Cl. 123—191 S **4 Claims**



1. An internal combustion engine of lean air-fuel mixture combustion type, comprising:

a cylinder block;

a piston reciprocably movable in the cylinder block and having a top surface;

a cylinder head fixed onto the cylinder block and having an inner surface;

a main combustion chamber formed between the top surface of the piston and the inner surface of the cylinder head;

a subsidiary combustion chamber formed in the cylinder head;

a connecting passage connecting the main combustion chamber with the subsidiary combustion chamber and opening into the main combustion chamber on the inner surface of the cylinder head for leading a lean air-fuel mixture from the main combustion chamber into the subsidiary combustion chamber and for injecting a high velocity burning jet from the subsidiary combustion chamber into the main combustion chamber;

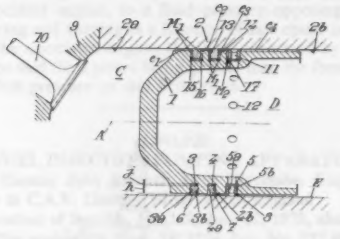
a spark plug having a spark gap located in a subsidiary combustion region consisting of the subsidiary combustion chamber and the connecting passage, and;

a squish flow producing means including a raised portion formed on one side of the top surface of the piston for forming a squish area which extends from the peripheral end of the inner surface of the cylinder head to the vicinity of the opening of the connecting passage along the inner surface of the cylinder head and for creating a squish flow along the inner surface of the cylinder head when the piston reaches the vicinity of the top dead center, said connecting passage being directed away from the squish area and arranged so that the high velocity burning jet injected from the connecting passage meets with the squish flow at an angle of less than 90°.

4,041,924
RECIPROCATING INTERNAL COMBUSTION ENGINE

Albert Grosseau, Chaville, France, assignor to Societe Anonyme Automobiles Citroen, France

Filed Sept. 15, 1975, Ser. No. 613,436
Claims priority, application France, Oct. 9, 1974, 74.34037
Int. Cl.[2] F02B 77/00; F01M 1/00
U.S. Cl. 123—193 CP 8 Claims



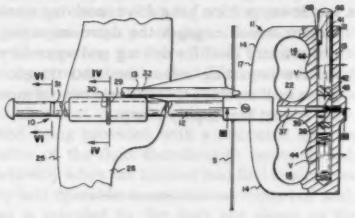
1. A reciprocating internal combustion engine, comprising:
a cylinder having a substantially horizontal axis and having one end thereof shaped as a combustion chamber and the other end thereof opening into a crankcase adapted to receive a lubricating atmosphere, said cylinder having a bottom zone where liquid lubricant may collect when the engine is stationary;
a piston slidable in said cylinder and having a space therein communicating with said crankcase, said piston having an outside surface formed with at least one peripheral sealing groove and a peripheral scraper groove, said peripheral grooves being of rectangular cross-section with a base and a pair of transverse surfaces, said scraper groove being nearest said other end of said cylinder and having the base thereof formed with orifices via which said scraper groove communicates with said space in said piston;
a substantially rectangular cross-section piston ring received with a reduced clearance in each said sealing groove; and
a substantially rectangular cross-section scraper ring received with a reduced clearance in said scraper groove;
said piston being received in said cylinder with clearance whereby annular gaps are formed between said outside surface of said piston and said cylinder on each side of each of said piston and scraper rings; in which engine the improvement comprises:
each said sealing groove being provided with first narrow passage means providing a continuous communication between the base of said sealing groove and said annular gaps on both sides of said piston ring in said sealing groove;
said scraper groove being provided with second narrow passage means providing communication between the base of said second groove and at least that annular gap which is on the side of said scraper ring nearest said one end of said cylinder;
both said first and said second passage means being disposed at a level above said bottom zone of said cylinder.

4,041,925
BOWSTRING RELEASE DEVICE

Robert R. Barrick, Parowan, Utah, assignor to John F. Cowen, Parowan, Utah

Filed Apr. 7, 1975, Ser. No. 565,516
Int. Cl.[2] F41B 5/00
U.S. Cl. 124—35 A 3 Claims

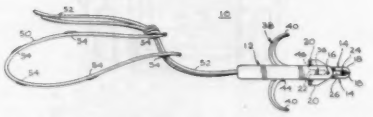
1. An accessory for an archery bow, comprising:
a. a one-piece body member shaped to form a hand grip with a bow string receiving slot in the front and a recess at one side of said slot and opening toward the front of said body member;
b. a one-piece catch member mounted in said recess for pivotal movement about a vertical axis, said catch member having a hook on the outer edge to engage a bow string disposed in said slot, said catch member also having a shoulder-forming recess;
c. a latch pin guided in said body member for longitudinal movement toward and away from said catch member, said latch pin having a shoulder formed thereon adjacent the end remote from said catch member;
d. spring means yieldably urging said latch pin toward said catch member to position the end adjacent thereto in said recess to engage the shoulder formed thereby and hold said catch member in bow-string retaining position; and
e. a plunger having a cam surface and an opening to receive said latch pin and position the shoulder thereon in registration with and engaging the cam surface on said plunger, the axial depression of said plunger causing the cam surface to react with the latch pin shoulder and move the latch pin out of the recess in the catch member and permit it to pivot and release the bow-string.



4,041,926
BOWSTRING RELEASE DEVICE

Fernando Troncoso, Jr., 1851 S. Orange Ave., Monterey Park, Calif. 91754, and Scott Lewis Bomar, 2910 S. Rita Way, Santa Ana, Calif. 92704

Filed Feb. 18, 1976, Ser. No. 659,099
Int. Cl.[2] F41B 5/00
U.S. Cl. 124—35 A 11 Claims



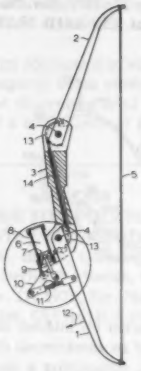
1. An improved archery bowstring release device, said device comprising, in combination:
a. a frame;
b. a pair of opposable spring biased jaws pivotably connected to said frame and having abuttable bowstring-retaining ends and opposite plunger engaging ends, the latter end when biased part defining a plunger space therebetween when said bowstring-retaining ends abut each other;
c. a trigger actuated plunger slideably disposed in said frame;
d. means biasing a portion of said plunger into said space to prevent movement of the jaws and to positively hold only a bowstring in bowstring-retaining position free of an arrow, the leading or jaw engaging end of said plunger portion having a diameter greater than that of the trailing end of said plunger portion so as to assure sudden non-creep opening of said jaws; and,
e. a trigger connected to said plunger for urging said plunger against said biasing and out of said space, thereby permitting said string-retaining ends to open and release a bowstring therefrom during shooting of an archery bow.

4,041,927

ARCHERY BOW WITH PIVOTED BOW LIMBS HAVING ROTATIONAL SYNCHRONIZER AND ADJUSTABLE DRAW FORCE MECHANISMS

Robert M. Van House, 268 Enfield Road, Dayton, Ohio 45459

Filed July 24, 1975, Ser. No. 598,569
Int. Cl.[2] F41B *11/00*
U.S. Cl. 124—61 13 Claims



1. An archery bow comprising:
a generally elongate central handle member having a pair of opposed end portions,
a master bow limb pivotally attached to the central handle member adjacent one end portion thereof,
a slave bow limb pivotally attached to the central handle member adjacent the other end portion thereof,
only one single elongate tension means extending through the elongate central handle member and provided with a pair of opposed free end portions and having one free end portion secured to the master bow limb and having the other end portion secured to the slave bow limb for synchronizing pivotal movement of the limbs, the tension means extending between the master bow limb and the slave bow limb.
single spring means for exerting a force through one of said bow limbs in opposition to a drawing force on the bow limbs by a user,
means attaching the single spring means to the central handle member, for support thereby,
linkage means connecting the spring means only to the master bow limb, for operation therewith,
and a bow string connected to the limbs adjacent a portion thereof which is spaced from the central handle member.

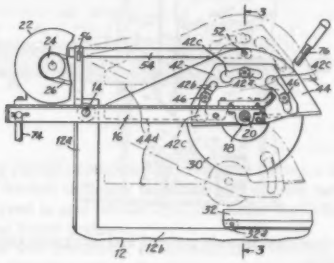
4,041,928

MASONRY SAW

Franklin E. Robinson, West Roxbury, Mass., assignor to Norton Company, Worcester, Mass.

Filed Apr. 29, 1976, Ser. No. 681,544
Int. Cl.[2] B28D *1/04*
U.S. Cl. 125—13 SS 13 Claims

1. A rotary saw comprising:
a support frame;
a work support on the frame;
a platform pivotally connected to an upper portion of the frame and having
a forward end portion extending above and pivotable toward and away from the work support;
bearing means on the forward end portion of the platform;
a shaft journalled in the bearing means;
a saw blade attached to the shaft for rotation about its axis;
drive means supported on the platform for rotating the saw blade;
a guide member attached to and extending adjacent the platform substantially normal to the axis of rotation and having
at least one arcuate slot between opposed arcuate guide surfaces spaced radially from and extending arcuately about the axis of rotation;
a safety guard, pivotally supported on the guide member, enclosing a circular segment of the saw blade, and pivotable about the saw blade relative to the guide member and having



a lower edge situated in a predetermined initial position; a follower attached to and projecting from a side of the guard into each arcuate slot and adapted for supporting, guiding and retaining engagement with the guide member during pivotal movement of the guard relative to the guide member;
link means, pivotally connected to the guard and frame, for pivoting and maintaining the lower edge of the guard in the predetermined initial position during pivotal movement of the saw blade relative to the work support and frame; and means for positioning and pivoting the platform and saw blade relative to the work support and frame.

4,041,929

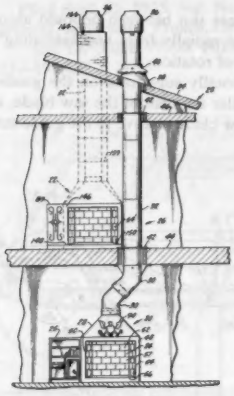
COMPOSITE FIREPLACE CONSTRUCTION

Jonathan Norton Cooksey, 3041 Kallin, Long Beach, Calif. 90808

Filed Feb. 10, 1975, Ser. No. 548,786
Int. Cl.[2] F24B *1/18*
U.S. Cl. 126—120 15 Claims

1. A composite molded fireplace with a firebox and a hood attached to said firebox to conduct exhaust products therefrom, said firebox having:
an inner refractory liner comprised of magnesium oxychloride cement and slate dust;
an outer shell comprised of magnesium oxychloride cement, structural fibers and organic resin; and
an insulating layer between said inner liner and said outer shell of magnesium oxychloride cement and inorganic expanded insulation and said hood having:
an outer shell comprised of magnesium oxychloride cement, structural fibers, and organic resins; and

an insulating layer within said hood comprised of magnesium oxychloride cement and inorganic expanded insulation.

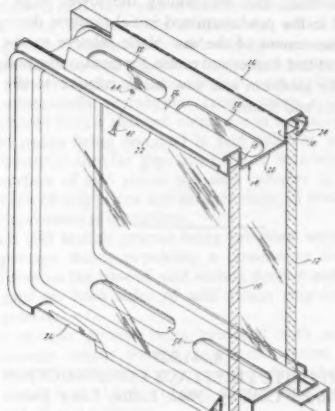


4,041,930

WINDOW UNIT FOR OVEN DOORS

Joseph W. Katona, Walled Lake, Mich., assignor to Mills Products, Inc., Farmington, Mich.

Filed Nov. 28, 1975, Ser. No. 635,100
Int. Cl.[2] F24C *15/04*
U.S. Cl. 126—198 12 Claims



1. A self-contained window unit adapted to be assembled into an oven door having front and back door panels with aligned window openings therein and means defining an air passage to allow air to flow upwardly through the door and the window unit therein, comprising first and second opposed glass panes, a continuous spacer member between said panes engaging the peripheral edges of said first pane and being spaced from the said second pane to define openings at the top and bottom of said unit communicating with the air passage in the door, connector plates extending across the peripheral edges of said panes at the bottom and side edges of said window unit, the connector plate at the bottom edge of said window unit including a channel formation surrounding the peripheral edge of one of said panes, said connector plates having flange portions holding said spacer member against the other said pane and holding said panes in spaced parallel relation, said one pane being removable from said channel formation by upward sliding movement to permit removal of said one pane.

4,041,931

RADIOPAQUE ANASTOMOSIS MARKER

Donald P. Elliott, 70 Eudora, Denver, Colo. 80220, and William L. Halseth, No. 3 Ponderosa Circle, Parker, Colo. 80134

Filed May 17, 1976, Ser. No. 687,034
Int. Cl.[2] A61B *19/00*
U.S. Cl. 128—1 R 4 Claims

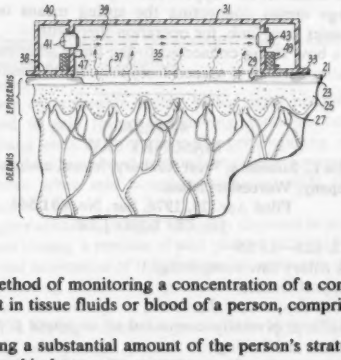
1. A radiopaque marker for internal implantation as a means for locating the site of an anastomosis during subsequent fluoroscopic examination, comprising a one-piece split ring of a radiopaque material and having a substantially circular configuration, said ring formed with a first loop intermediate the ends thereof providing a spring normally urging the ends toward one another and defining a suture receiving opening for suturing the ring to adjacent tissue, and the ends of the rings formed into closed, second and third loops, respectively, thus defining suture receiving openings and at the same time eliminating exposed sharp ends, said ring and loops being substantially coplanar and the ring being spreadable to enable placement of the ring over a sutured-in-place vein, the suture receiving openings being substantially diametrically opposite one another, thus preventing tilting of a sutured in place marker.

4,041,932

METHOD FOR MONITORING BLOOD GAS TENSION AND PH FROM OUTSIDE THE BODY

Moshe A. Fostick, 758-18th Ave., San Francisco, Calif. 94121

Filed Feb. 6, 1975, Ser. No. 547,649
Int. Cl.[2] A61B *5/00*
U.S. Cl. 128—2 G 28 Claims



1. A method of monitoring a concentration of a constituent of interest in tissue fluids or blood of a person, comprising the steps of:

removing a substantial amount of the person's stratum corneium skin layer over an area,

positioning a chamber over said area in a manner to permit gases or fluids escaping from the body through said area to enter the chamber,

sealing the chamber to the skin around said removed skin

area in a gas and liquid tight manner, thereby to isolate the chamber and the removed skin area from surrounding atmosphere,

collecting in the chamber gases or fluids emitted from the removed skin area in the chamber for a time until the transfer of the constituent of interest between the chamber and the body of the person is in equilibrium,

passing a beam of electromagnetic energy above the skin through the collected gases or fluids within said chamber, said electromagnetic energy including certain wavelengths that are absorbed an amount proportional to the concentration of said constituent of interest in said chamber, and

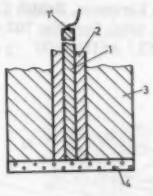
measuring the energy absorption of said certain wavelengths of said electromagnetic beam passing through said chamber, whereby the absorption level is proportional to the concentration of a constituent of interest in the body of said person.

4,041,933

ELECTRODE FOR POLAROGRAPHIC MEASUREMENTS IN PHYSIOLOGICAL MEDIA

Helmut Reichenberger, Brand, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Apr. 11, 1975, Ser. No. 567,175
Int. Cl.[2] A61B 5/04
U.S. Cl. 128—2 E **24 Claims**



1. In an electrode for polargraphic/measurements in physiological media, in particular an oxygen electrode for measuring the oxygen tension in the human or animal body, including a noble metal cathode and an insulating material sheathing said cathode, a connector for an electrical power supply, indicating and processing unit being provided at the distal end of said cathode, an oxygen-pervious conductive membrane covering the proximal end of said cathode, and said proximal end of the cathode being conductively connected to an anode through said physiological medium, the improvement comprising: said noble metal cathode having the form of a conductor cable piece including at least one noble metal wire embedded in said insulating material and extending therethrough so as to constitute a conductor wire; a further body-compatible insulating material sheathing said insulated noble metal cathode, said further insulating material including at least two foils, said noble metal cathode being embedded between said foils, said foils being intimately connectablewith each other through thermal welding and pressable into circular shape through thermoplastic deformation.

4,041,934

ARTERIAL BLOOD SAMPLING UNIT

Joseph Nicholas Genese, Waukegan, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Filed Feb. 2, 1976, Ser. No. 654,680
Int. Cl.[2] A61B 5/14
U.S. Cl. 128—2 F **17 Claims**

1. A blood sampling unit comprising:

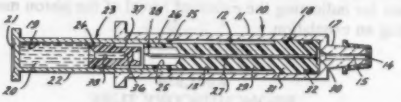
a barrel member defining a substantially tubular chamber having an internal wall section,

means defining a nozzle member communicating with said tubular chamber for attachment with a cap member in one instance and a needle in another instance,

a slidable member including a passage means in open communication with opposing ends of said slidable member, said slidable member having a closure piercing portion communicating with said passage means,

a sealing element operatively associated with said slidable member and disposed opposite said closure piercing portion, said sealing element constructed and arranged to engage the internal wall section of said barrel member,

said sealing element and said internal wall section engaged by said sealing element cooperating to provide a low friction sealing element,



said sealing element composed of a material having a coefficient of friction sufficient to permit said slidable member to be moved in said tubular chamber under the influence of arterial blood pressure,

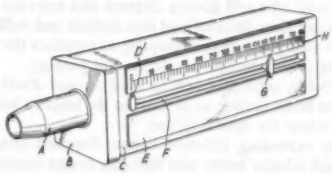
a stoppered vial containing an anticoagulant material constructed and arranged to be accommodated within said tubular chamber of said barrel and engaged by said slidable member so that upon movement of said vial into said barrel said piercing portion of said slidable member will penetrate through said stopper of said vial and effect flow of anticoagulant material through said passage member and by means of further movement of said vial will effect placement of said anticoagulant material between said low friction sealing element and said nozzle member.

4,041,935

DEVICE FOR BREATHING MEASUREMENT

Dietmar Rudolf Garbe, Maids Moreton, England, assignor to Vitalograph (Ireland) Limited, Lifford Ennis, Ireland

Continuation of Ser. No. 556,014, March 6, 1975, abandoned.
This application Sept. 16, 1976, Ser. No. 723,958
Claims priority, application United Kingdom, Mar. 7, 1974, 10194/74
Int. Cl.[2] A61B 5/08
U.S. Cl. 128—2.08 **7 Claims**



1. A device for monitoring a patient's ability to exhale comprising a hollow body part, a piston member having first and second sides, said piston member being moveably mounted in said hollow body part, a mouthpiece mounted to said hollow body part and communicating with the interior of the hollow body part on the first side of the piston member for admitting exhaled air to said first side of the piston member, said piston member being moveable between a first position adjacent the point at which the mouthpiece is mounted to said hollow body part and a second position spaced from said point and determined by the patient's rate of exhalation into said mouthpiece, resilient loading means in the hollow body part and in contact with said piston member for opposing movement of the piston member in the hollow body part away from said mouthpiece

by pressure of exhaled air on said first side of the piston member, venting means in said hollow body part for permitting the discharge of part of the exhaled air from the interior of the hollow body part, said venting means being in communication with the interior of the hollow body part on the second side of said piston member when piston member is in said first position and venting the exhaled air to atmosphere only after the piston member passes said venting means as said piston member moves to said second position, said venting means comprising a plurality of individual vents, individual removable seals in said vents for controlling the amount of exhaled air permitted to be discharged from the hollow body part, the amount of exhaled air discharged from said hollow body part being increased by removal of one or more of said individual seals, and means for indicating the extent of travel of the piston member during an exhalation.

4,041,936

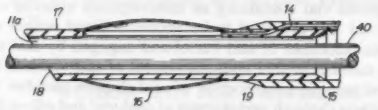
BRONCHOSCOPY TUBE

Edward Carden, Marina del Rey, Calif., assignor to Medical Engineering Corporation, Milwaukee, Wis.

Filed Apr. 23, 1975, Ser. No. 570,750

Int. Cl.[2] A61B *1/06, 17/24;* A61M *25/02*

U.S. Cl. 128—6 **8 Claims**



1. A tube for inserting a flexible, elongated, generally cylindrical, fiberoptic bronchoscope through the vocal cords in the larynx while maintaining adequate volumes of gas for ventilating the patient, said tube comprising:

a tubular body of flexible material having first and second axially aligned sections with a central passage extending from a proximal to a distal end having received within each of said sections bronchoscope, said first section of said tubular body being immediately adjacent the distal end and having an external diameter sufficiently small to permit passage between the vocal cords of the patient and an internal diameter which maximizes clearance with the bronchoscope, said first section being sufficient in length to pass through the larynx into the trachea beyond, said distal end being shaped to provide a smooth tip for ease of insertion, said second section being adjacent said proximal end of said tube and having internal and external diameters greater than those of said first section and sufficiently large to pass gas volumes adequate to ventilate the patient with the bronchoscope in said central passage;

an expandable, inflatable cuff located on said distal end of said first body section so as to be in the trachea below the larynx when the tube is in use;

an axially extending inflation lumen disposed contiguous with said tubular body, said inflation lumen communicating with said cuff for permitting inflation of same; and

an adaptor affixed to the proximal end of said tubular body and communicating with said central passage, said adaptor being provided with means for connection to ventilating gas supply means and an entry port for introducing the bronchoscope into said central passage, said port having means for forming a seal with the bronchoscope.

4,041,937

MEDICAL IMPLEMENT

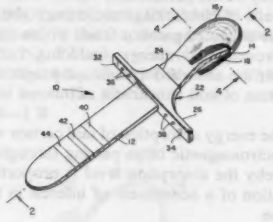
Marcellina Diaz, 114-18 209th St., St. Albans, N.Y. 11411

Filed Aug. 23, 1976, Ser. No. 716,531

Int. Cl.[2] A61B *1/24*

U.S. Cl. 128—15 **10 Claims**

1. A medical implement in the form of a tongue blade suitable for use in rendering first aid assistance to seizure patients comprising a planar blade body having pressure pad means secured at one end thereof for contacting the patient's tongue to hold same firmly in place, mouthpiece means attached to the blade body being located for registration with the confronting



upper and lower teeth of the patient for providing protective cushioned tooth impact, said mouthpiece further having depth guide means extending transversely from the blade body for contacting the periphery of the mouth to prevent overinsertion of the tongue blade.

4,041,938

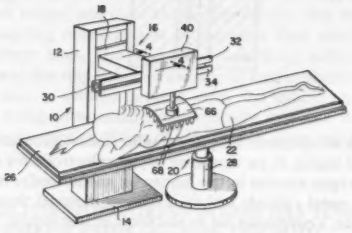
MASSAGE APPARATUS

Helen Wintoniw, Box 215, Keremeos, British Columbia, Canada

Filed July 8, 1976, Ser. No. 703,415

Int. Cl.[2] A61H *7/00*

U.S. Cl. 128—52 **6 Claims**



1. Massage apparatus comprising:

a support;

a housing mounted on said support;

means for reciprocably driving said housing in a horizontal direction relative to said support;

body massage means universally mounted on said housing; and

means within said housing for reciprocably driving said body massage means in a vertical direction relative to said support.

4,041,939

SURGICAL IMPLANT SPINAL SCREW

John Emmett Hall, Boston, Mass., assignor to Downs Surgical Limited, Mitcham, England

Filed Apr. 26, 1976, Ser. No. 680,234

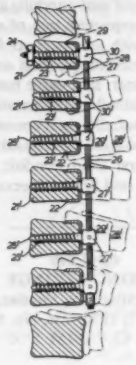
Claims priority, application United Kingdom, Apr. 28, 1975, 17612/75

Int. Cl.[2] A61F *5/00;* A61B *17/18*

U.S. Cl. 128—69 **10 Claims**

2. A surgical implant which comprises a metal spinal screw having a head provided with a hole through which a metal cable can be passed, the head being capable of being deformed to prevent movement of the cable within the hole, and a shank

having a relatively coarse self-tapping thread over a major portion of its length proximate said head and, on an end portion



remote from the head, a relatively fine nut-receiving thread of smaller external diameter.

4,041,940

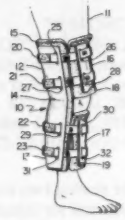
CONTOURED KNEE IMMOBILIZER

S. Arthur Frankel, 2 Poly Drive, Billings, Mont. 59101, and Glenn F. Cueman, R.D. 3, Lake Sharon, Warsaw, Ind. 46580

Filed Nov. 5, 1975, Ser. No. 629,192

Int. Cl.[2] A61F *3/00*

U.S. Cl. 128—80 C **4 Claims**



1. A contoured knee immobilizing device comprising

a unitary elongated substantially rigid shell in the form of a channel having a substantially U-shaped cross-section, said shell including

an upper tapered portion to be fitted about the leg above the knee,

a lower tapered portion to be fitted about the leg below the knee, and

a midportion having a semi-circular dimension less than the adjacent portions of said upper and lower portions rigidly connecting said upper and lower portions with the axes of said upper and lower portions oriented at an obtuse angle of about 170°;

cushioning means carried within said shell to be disposed between the leg and said shell for cushioning the leg received by said shell;

a substantially rigid upper plate in the form of an inverted isosceles trapezoid with a curved recess at the bottom edge thereof adjacent said upper portion;

a substantially rigid lower plate in the form of an inverted isosceles trapezoid with a curved recess at the top edge thereof adjacent said lower portion;

foam pads coupled to said upper plate and said lower plate; and

straps coupled to said shell including a looped fabric located on one face of each strap and looped-fabric engaging hooks located on the same face of each strap for releasably coupling straps onto said upper and lower plates;

wherein said cushioning means and said foam pads are adapted to wholly encompass the human leg except for the patella.

4,041,941

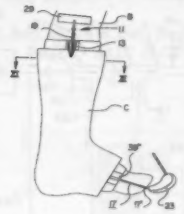
MEANS FOR AND METHOD OF REMOVING A CAST

K. Dwight Driver, 5338 Patrick Henry, Bartlett, Tenn. 38134

Filed May 5, 1976, Ser. No. 683,315

Int. Cl.[2] A61F *15/02, 13/04*

U.S. Cl. 128—91 A **10 Claims**



1. Means for removing a cast from a body member, said means for removing a cast comprising a saw means for cutting through the cast, said saw means including a flexible elongated saw member having a first end and a second end, said saw member including a plurality of saw teeth provided only adjacent said second end thereof and being substantially smooth along its entire length except for said second end thereof, said saw means including a first handle member removably attached to said first end of said saw member and including a second handle member fixedly attached to said second end of said saw member.

4,041,942

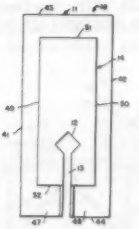
SURGICAL DRAPE

Ramon C. Dougan, Schaumburg, Ill., and Helen T. Rudtke, Medford, N.Y., assignors to American Hospital Supply Corporation, Evanston, Ill.

Filed June 15, 1976, Ser. No. 696,385

Int. Cl.[2] A61F *13/00*

U.S. Cl. 128—132 D **25 Claims**



1. A surgical drape comprising a sterile sheet of non-woven cellulosic material, a generally diamond-shaped opening in said sheet and a slot extending from a corner of said opening to an edge of said sheet.

4,041,943

CONTROL APPARATUS FOR VARIABLE REGULATION OF LUNG INFLATION HOLD TIME

Bruce B. Miller, 714 Ashley Drive, Kalamazoo, Mich. 49001

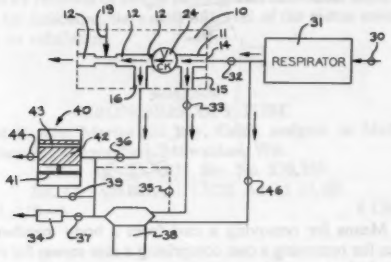
Filed Aug. 25, 1975, Ser. No. 607,103

Int. Cl.[2] A61M *16/00*

U.S. Cl. 128—145.8 **4 Claims**

1. In a system used for intermittent positive pressure lung

treatment including a gas source, a first gas line, a breathing element for providing the gas to the lungs of a patient upon inspiration, respirator means providing an intermittent positive pressure from said source to said breathing element via said first gas line, a second gas line and a normally closed pressure sensitive exhaust valve means for allowing elimination of the gas upon expiration from the lungs including a valve element connected to the breathing element and a control chamber connected to the respirator via said second gas line, said valve element being responsive to a pressure within said control chamber whereby said exhaust valve element is opened at a predetermined pressure limit established in said control chamber when the pressure is released therefrom, the improvement



comprising a housing having a passageway therethrough, a one way check valve mounted in said passageway, said passageway being connected into said second gas line so as to have an upstream side connected to the respirator and a downstream side connected to the respirator and a downstream side connected to the exhaust valve control chamber, a vent connected to said passageway on the downstream side of said check valve and having a variable constriction for controlling gas flow out the vent, thereby relieving the pressure in said exhaust valve control chamber to establish said predetermined pressure limit at which said exhaust valve element opens, whereby there is a delay in the opening of the exhaust valve causing gas to be held in the lungs for a period of time.

4,041,944

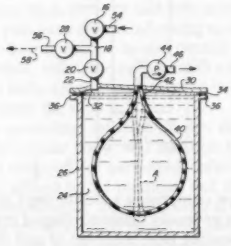
BODY FLUID TRANSFUSION AND DISPLACEMENT APPARATUS AND METHOD

William A. Rhodes, 4421 N. 13th Place, Phoenix, Ariz. 85014

Filed July 21, 1975, Ser. No. 597,501

Int. Cl.[2] A61M *1/02, 5/14*

U.S. Cl. 128—214 B **5 Claims**



1. A means for displacing and transfusing body fluids relative to a patient comprising: a substantially rigid container; a distensible and collapsible container disposed in said substantially rigid container; a first fluid conduit communicating with the interior of said substantially rigid container; a second fluid conduit communicating with the interior of said distensible and collapsible container; first and second hollow needles adapted to be inserted into a patient's blood vessels; said first and second needles being coupled to and in communication with respective ones of said conduits and the interior of said first and second fluid containers respectively; and reversible means communicating with one of said conduits and adapted to move fluid into and out of a respective one of said containers; said pump communicating with said second fluid conduit; valve means disposed and adapted for purging air bubbles out of said substantially rigid container; said valve means comprises three valves; the first one of said valves communicating directly with the interior of said substantially rigid container; a second valve communicating with said first valve; said second valve communicating with said first fluid conduit; and a third valve communicating between said first and second valve for venting bubbles or the like.

4,041,945

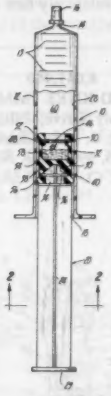
MIXING SYRINGE

Aeneas C. Guiney, 2855 Silverhill, Pontiac, Mich. 48055

Filed June 7, 1976, Ser. No. 693,423

Int. Cl.[2] A61M *5/00*

U.S. Cl. 128—218 M **6 Claims**



1. A syringe assembly for storing two materials separately in readiness for mixing together and for injection as a liquid at the time of use, the combination of; a tubular cylinder, a needle adapter formed by one end of said cylinder for communication with the interior of said cylinder and being adapted to receive a hypodermic needle, a plunger slidably disposed in said cylinder and projecting from an open end thereof, said plunger forming a first chamber therein, a movable wall member forming part of said plunger and a wall of said first chamber, a second chamber formed in said cylinder between said plunger and said needle adapter, said second chamber being adapted to contain one of the materials to be mixed and said first chamber containing the other of said materials, said plunger having a head portion forming said first chamber, said movable wall member being relatively rigid and having a peripheral edge portion normally seated in sealing engagement with said head portion to separate said first and second chambers from each other, and means to displace said wall and open said chambers to each other for mixing said materials, said plunger being movable towards said needle adapter to displace said mixed materials from said cylinder.

4,041,946

MEDICATED MEMBER FOR PIERCED EARS

William R. Barton, 940 Catherine St., Green Bay, Wis. 54301

Filed Aug. 28, 1975, Ser. No. 608,776

Int. Cl.[2] A61M *7/00;* **A61J** *1/00*

U.S. Cl. 128—260 **8 Claims**

1. A medicated unit especially adapted for use in connection with a pierced earlobe, a means for providing a continuously

available supply of medicament to said earlobe comprising an elongated absorbent flexible member of substantially uniform circular cross-section and having a length that is substantially greater than the average thickness of said earlobe, said absorbent flexible member having two distal end portions, a first end portion including a jacket portion that defines a sleeve for receiving said distal end and terminating in a generally rounded head section, said head section communicating with said sleeve by a second member having a reduced diameter relative to said sleeve and head section, said second distal end

portion including a second exposed sleeve open at one end defining a mouth adapted to receive said head section and when said ends are joined said elongated absorbent flexible member is shaped to form a continuous loop, said member containing an effective amount of a suitable medicament distributed throughout the length thereof whereby when said medicated elongated absorbent flexible member length engages and passes through said pierced earlobe during normal use and is joined to said second sleeve said medicated member is in continuous movable dispensing contact with and through said pierced earlobe.

4,041,947

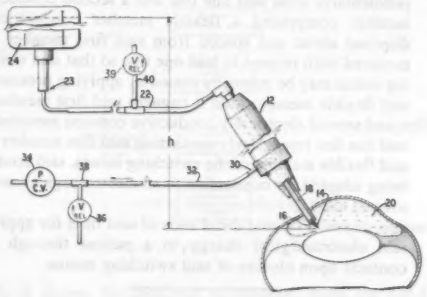
FLOW CONTROL SYSTEM

Steven N. Weiss, New York, and Alan Broadwin, Brooklyn, both of N.Y., assignors to Cavitron Corporation, New York, N.Y.

Division of Ser. No. 437,165, Jan. 28, 1974, Pat. No. 3,902,495. This application June 23, 1975, Ser. No. 589,484

Int. Cl.[2] A61M *1/00*; G05D *11/11*

U.S. Cl. 128—276 **5 Claims**



1. A fluidic flow system for use in irrigation of a small elastic pressure responsive chamber, said chamber having an opening therein for fluid communication with said chamber, said flow system comprising

an irrigation fluid source at a preselected pressure of from about 10 to 100 mm Hg,

fluid inflow means connected to said fluid source and suitable for fluid communication with said chamber through said opening, said fluid inflow means having a flow resistivity of from about 0.42 to 18.5 mm Hg per ml fluid per min so that the flow of the fluid from said source into said chamber is limited to a maximum predetermined flow rate, and

pressure limiting means in fluid communication with said fluid inflow means intermediate said chamber and said fluid source, said pressure limiting means operative in response to a predetermined pressure of being about 10 and 100 mm Hg in said fluid inflow means to limit in cooperation with said flow resistivity the pressure of the fluid intended for inflow to said chamber to said predetermined pressure.

4,041,948

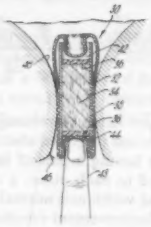
DIGITAL TAMPON

Eric Flam, East Brunswick, and Doris Phyliss Partyka, Milltown, both of N.J., assignors to Johnson & Johnson, New Brunswick, N.J.

Filed July 26, 1976, Ser. No. 708,507

Int. Cl.[2] A61F *13/20*

U.S. Cl. 128—285 **8 Claims**



1. In a catamenial tampon of the type comprising a generally cylindrical absorbent body and adapted for digital insertion, the improvement which comprises: providing therein an at least partially absorbent rigidifying element extending longitudinally and disposed centrally with respect to the axis of said tampon; said element consisting of a material having a dry resistance to compression sufficient to allow insertion and a wet resistance to compression less than the dry resistance and sufficiently low enough to allow said tampon to expand and be comfortable in use.

4,041,949

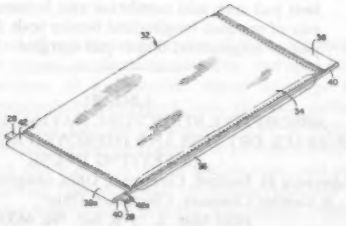
FLEXIBLE WAISTBAND DIAPER

Theodore Frederick Kozak, Manchester, Conn., assignor to Union Carbide Corporation, New York, N.Y.

Filed July 2, 1976, Ser. No. 702,211

Int. Cl.[2] A61F *13/16*

U.S. Cl. 128—287 **18 Claims**



1. A disposable diaper having a stretchable waistband comprising in combination a topsheet for placement adjacent to the body and being provided with means for passing liquid therethrough, a water impermeable backsheet and an absorbent pad disposed between said topsheet and backsheet, one of said topsheet or backsheet being fabricated from a water impermeable stretchable plastic film having a Young's Modulus of less than 5000 lbs/in^2 and which exhibits recovery characteristics such that at up to 20% elongation it will recover about 99%

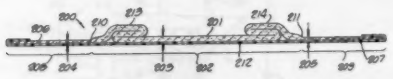
and from 20 to 50% elongation it will recover from 99 to 90%, respectively, and still maintain a force of 0.05 lbs, means for providing an expansible waist portion for the diaper comprising said stretchable plastic film having end portions extending beyond the longitudinal end of said absorbent pad, each end portion being folded upon itself and adhered to itself to form a stretchable waistband for the diaper, and a pair of laterally and oppositely extending fastening means disposed on said waistband for securing said diaper on an infant.

4,041,950

FLUFFED PULP URINE TRAP DIAPER

John Leslie Jones, Sr., 1070 Glen Oaks Blvd., Pasadena, Calif. 91105

Filed July 23, 1976, Ser. No. 706,762
Int. Cl.[2] A61F *13/16, 13/18*
U.S. Cl. 128—287 **12 Claims**



1. An infant diaper having a rectangular absorbent pad area formed of fluffed wood pulp and absorbent cellulose sheeting, aforesaid pad area having a pair of longitudinal pad margins oppositely disposed to each other, a central longitudinal pad axis, and a total pad width axis normal to said longitudinal pad axis, wherein the improvement combination comprises:

a pair of absorbent border pad areas and one central pad area together in combination form the aforesaid absorbent pad area, each one of said border pad areas having one longitudinal boundary margin adjacently coextensive with one central pad area longitudinal boundary margin, each one of said pair of border pad areas and said central pad area having a discrete weight concentration of fluffed cellulose pulp and cellulose sheeting per unit of each pad area;

a pair of narrow width pad pleats disposed parallel along the full longitudinal pad axis length, each one of said pair of pad pleats formed of said central pad area and disposed on the first face of said pad area adjacent to the longitudinal boundary margin of said central pad area, a major proportion of the central pad width being free of coverage by said pair of narrow pleats, the total absorbent pad width axis value having the value of the second face width of said absorbent pad area, excluding the side width values of the pair of narrow width pleat sides, said pair of pleats and the spaced pad area between said pleats together providing an excreta channel pad area; and,

a thin, flexible, fluid impermeable membrane disposed adjacently co-extensive with said second face of said absorbent pad area, said membrane also forming each one of a pair of opposed longitudinal border seals disposed on said pair of longitudinal diaper pad margins.

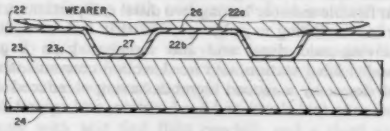
4,041,951

ABSORPTIVE STRUCTURE HAVING IMPROVED SURFACE DRYNESS AND IMPROVED RESISTANCE TO REWETTING IN-USE

Lawrence H. Sanford, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Mar. 2, 1976, Ser. No. 663,022
Int. Cl.[2] A61F *13/16*
U.S. Cl. 128—287 **12 Claims**

1. In a disposable diaper having a substantially planar, moisture absorbent layer disposed between a soft and bulky, wearer-contacting, topsheet which is uniformly moisture-pervious along its entire surface and a moisture-resistant backing sheet, the improvement wherein said uniformly moisture-pervious topsheet comprises a wet resilient, integral structure containing a multiplicity of upwardly open depressed areas which intimately contact the uppermost surface of said substantially planar, moisture absorbent layer in-use, non-depressed areas, surrounding said depressed areas and contacting the wearer's skin in-use, said depressed and said non-depressed areas being of substantially uniform density throughout, said non-



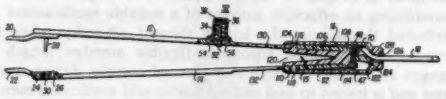
depressed areas tending to isolate the wearer's skin from moisture contained within said moisture-absorbent layer in-use, thereby providing improved surface dryness and improved resistance to rewetting.

4,041,952

ELECTROSURGICAL FORCEPS

Charles F. Morrison, Jr., Boulder, and Alan Z. Puszman, Lyons, both of Colo., assignors to Valleylab, Inc., Boulder, Colo.

Filed Mar. 4, 1976, Ser. No. 664,061
Int. Cl.[2] A61B *17/36;* A61N *3/06*
U.S. Cl. 128—303.13 **13 Claims**



1. An electrosurgical forceps comprising:

a first tine having a distal end and a proximal end;

a second tine having a distal end and a proximal end, said first and second tines being flexibly mounted with respect to each other with said distal ends being adjacent one another;

switching means mounted on only one of said tines, said switching means being manually operable to effect the closure thereof and comprising a first conductive member mounted with respect to and extending substantially perpendicularly from said one tine and a second conductive member comprising a flexible member concentrically disposed about and spaced from said first member and mounted with respect to said one tine so that said switching means may be manually closed by applying pressure to said flexible member until it engages said first member;

first and second electrically conductive contacts mounted on said one tine respectively contacting said first member and said flexible member of the switching means, said contacts being adapted for connection to an electrosurgical energy source; and

means disposed on said distal ends of said tines for applying said electrosurgical energy to a patient through said contacts upon closure of said switching means.

4,041,953

CARDIAC PACER CIRCUIT

Jon A. Anderson, Marine-on-the-St. Croix, and Richard W. Kramp, Bloomington, both of Minn., assignors to Cardiac Pacemakers, Inc., St. Paul, Minn.

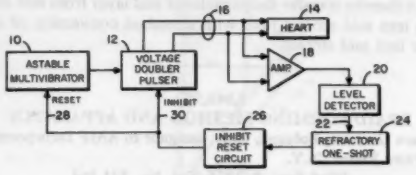
Continuation of Ser. No. 515,463, Oct. 17, 1974, abandoned, which is a continuation-in-part of Ser. No. 460,585, April 12, 1974, abandoned. This application Apr. 16, 1976, Ser. No. 677,735
Int. Cl.[2] A61B *1/36*
U.S. Cl. 128—419 PG **4 Claims**

1. A cardiac pacer circuit of the type including a pulse generator for producing electrical pacer pulses at a fixed rate and duration, electrode means coupled to the output of said

pulse generator for applying said pulses to the heart of a patient and for picking up bipolar depolarization signals from said heart upon the normal beating action thereof and first inhibiting means responsive to said depolarization signals for inhibiting the output of said pulse generator upon the occurrence of said depolarization signals, the improvement comprising:

a. difference amplifier means coupled to said electrode means for amplifying said bipolar depolarization signals;

b. a bandpass filter network connected to the output of said



difference amplifier means for attenuating the frequency components of the amplifier output signals above and below a predetermined frequency band;

c. converter means connected to receive the output from said bandpass filter network for converting said bipolar signals to unipolar triggering pulses when the bipolar signals from said filter means exceed a predetermined amplitude; and

d. means for applying said triggering pulses to said inhibiting means.

4,041,954

SYSTEM FOR DETECTING INFORMATION IN AN ARTIFICIAL CARDIAC PACEMAKER

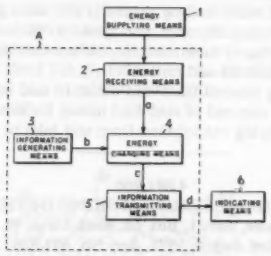
Yuichi Ohara, Tokyo, Japan, assignor to Kabushiki Kaisha Daini Seikosha, Japan

Filed May 7, 1975, Ser. No. 575,129

Claims priority, application Japan, May 7, 1974, 49-50409; May 8, 1974, 49-50831; May 14, 1974, 49-53542

Int. Cl.² A61B 5/00

U.S. Cl. 128—419 PT **22 Claims**



1. A system for detecting information about the e.m.f. of series-connected batteries in an artificial cardiac pacemaker comprising: energy supplying means for supplying energy to the artificial cardiac pacemaker from the outside; energy receiving means in the pacemaker for receiving said energy; information generating means for generating an information signal representative of the e.m.f. of the batteries in the pacemaker including a plurality of transistors each of which is connected to one of said batteries such that each transistor changes from one state to the other state when the e.m.f. of the corresponding battery becomes less than a predetermined value; energy changing means receptive of the energy passing through said energy receiving means for changing the energy into an information energy signal according to said information signal; transmitting means for transmitting said information energy signal to the outside of the pacemaker; and indicating means for indicating the information in the pacemaker according to said information energy signal.

4,041,955

IMPLANTABLE LIVING TISSUE STIMULATOR WITH AN IMPROVED HERMETIC METAL CONTAINER

Frank L. Kelly, Granada Hills, and Jozef I. Kie Sioe Tan, Sylmar, both of Calif., assignors to Pacesetter Systems Inc., Sylmar, Calif.

Filed Jan. 29, 1976, Ser. No. 653,464

Int. Cl.² A61N 1/36

U.S. Cl. 128—419 P **15 Claims**

1. In an implantable living tissue stimulator of the type including a plurality of circuit means, the improvement comprising:

hermetic means for hermetically sealing at least some of said circuit means, said hermetic means comprising a hermetic container formed of a thin layer of metal of a thickness definable as T, said metal being characterized by an electrical resistivity definable as ρ, where $T/\rho < 0.03$, T being in mils and ρ in microhm-cm, said metal layer being impervious to body saline fluid and gases.

4,041,956

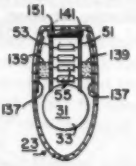
PACEMAKERS OF LOW WEIGHT AND METHOD OF MAKING SUCH PACEMAKERS

David L. Purdy, Indiana; Vernon L. Speicher, Leechburg; Frederick J. Shipko, Spring Church, and William L. Johnson, Kittanning, all of Pa., assignors to Coratomic, Inc., South Indiana, Pa.

Filed Feb. 17, 1976, Ser. No. 658,737

Int. Cl.² A61N 1/36

U.S. Cl. 128—419 P **23 Claims**



1. The method of making a pacemaker of parts including a primary power source, an electrical converter, and open complementary sections of a container whose openings are bounded by substantially congruent rims, the said method comprising, engaging said source and converter to form a subassembly, prepotting said subassembly to provide a body of dimensions such that it nests in one of said sections, said prepotted body having opening means permitting injection of additional potting material on at least one wall thereof, nesting said body in said one section, joining said one section and said other complementary section along said congruent rims to form said container, and injecting potting material through said opening means to substantially fill the space between said one wall and said section.

6. The method of claim **1** wherein the sections of the container are so formed as to provide a hole therein through which conductor means to be connected to a catheter are brought out and wherein the additional prepotting material is injected by means inserted into the openings in the prepotted body through said hole.

4,041,957

SLENDERIZING LADIES' ROLL-ON BELT OF IMPROVED COMFORT

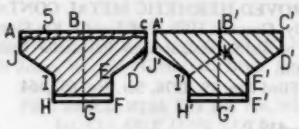
Guy Dubois, Avenue Lorette 9, Ohain, Belgium

Filed Dec. 3, 1975, Ser. No. 637,191

Claims priority, application Belgium, Dec. 10, 1974, 151341; June 12, 1975, 157275

Int. Cl.² A41C *1/00*

U.S. Cl. 128—540 **5 Claims**



1. A slenderizing and comfort-improving elastic underwear garment, comprising two assembled component panels of like shape made of elastic fabric having parallel resilient fibres defining lines of force, each panel having a longitudinal axis and being of a shape consisting of first and second substantially rectangular portions of different sizes interconnected by an intermediate trapezoidal portion, the first rectangular portion being of greater size than the second rectangular portion, said lines of force of the elastic fabric extending in each panel obliquely with respect to the longitudinal axis thereof, said panels being partially superposed in said garment and forming overlapping portions in which longitudinal edges of the first rectangular portion of each of said panels are assembled onto the other of said panels along the longitudinal axis thereof, said lines of force of said panels being crossed in said overlapping portions.

4,041,958

APPARATUS FOR PRODUCING A CONTINUOUS TOBACCO STREAM

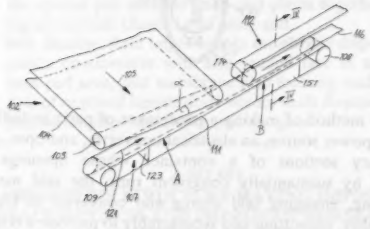
Günter Wahle, Reinbek; Dieter Ludszeweit, Hamburg; Jürgen Gömann, Dassendorf, and Horst Zessin, Hamburg, all of Germany, assignors to Hauni-Werke Korber & Co. KG, Hamburg, Germany

Filed Feb. 6, 1975, Ser. No. 547,447

Claims priority, application Germany, Mar. 2, 1974, 2410168

Int. Cl.² A24B *3/00*; A24C *5/00*

U.S. Cl. 131—84 B **10 Claims**



1. Apparatus for converting a wide carpet of tobacco particles into a narrow stream, comprising a first conveyor having means for transporting said carpet in a first direction along a first path; a second conveyor having a first foraminous belt for transporting said stream along a second path which is spaced apart from said first path and a first suction chamber adjacent to said second path, said belt being located between said suction chamber and said second path; an intermediate conveyor having a second foraminous belt defining a third path extending between said first and second paths, means for moving said second belt in a second direction from said first path toward said second path and a second suction chamber adjacent to said third path, said second belt being located between said second chamber and said third path, the width of said second belt exceeding the width of said first belt and said first and third paths being inclined with respect to each other so that said first and second directions make an oblique angle; means for evacuating air from said second chamber to thereby transfer the particles of said carpet into said third path along a zone having a length exceeding the width of said second belt due to the inclination of said first and third paths with respect to each other, the thus transferred particles forming on said second belt a layer which advances along said third path toward said second path; and means for evacuating air from said first chamber to thereby transfer the particles of said layer from said third path into said second path with attendant conversion of said layer into said stream.

4,041,959

BRAID FORMING METHOD AND APPARATUS

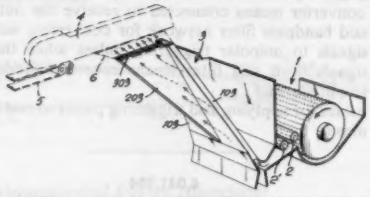
Franco Garrone, Bologna, Italy, assignor to AMF Incorporated, White Plains, N.Y.

Filed Sept. 8, 1976, Ser. No. 721,264

Claims priority, application Italy, Oct. 8, 1975, 12825/75

Int. Cl.² A24C *5/18*

U.S. Cl. 131—84 B **9 Claims**



1. Apparatus for forming a continuous cut tobacco braid in a cigarette maker, comprising

a substantially vertical T-shaped duct means with smooth walls having a longitudinally disposed leg and a pair of arms extending laterally from the root of said leg,

said duct means having an inlet at one end for receiving cut tobacco from a carding unit and an oulet at the other end for discharging cut tobacco to an endless belt type braid forming tape,

said inlet and outlet having generally the same geometrical shape and being disposed orthogonal to each other,

said arms being symmetrical to one another and tapered from said inlet to said outlet,

said leg being tapered from said outlet to said inlet,

and means at one end of said duct means for creating an air flow conveying cut tobacco from said inlet to said outlet.

4,041,960

LIQUID FILTERED SMOKING DEVICE

Richard W. Kahler, Rte. 1, Box 61, Rock Cave, W. Va. 26234

Filed Aug. 4, 1975, Ser. No. 601,826

Int. Cl.² A24F *1/30*

U.S. Cl. 131—173 **10 Claims**

1. A liquid filter smoking device, comprising:

a container having an opening at one end thereof and having a liquid filtering medium therein;

a hollow tube open at both ends, one of said ends being inserted into said container and immersed within said liquid filtering medium while the other end projects outwardly of said container;

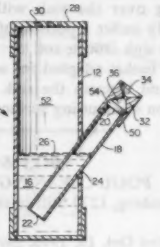
a smoking bowl having one end disposed upon said other end of said hollow tube, for retaining smoking tobacco therewithin and for permitting smoke to pass therefrom into said tube;

filter means disposed within said bowl for retaining ash and tobacco material within said smoking bowl; and

said filter means comprises:

an annular ring member;

a radially inwardly-projecting annular ring portion integrally connected to the bottom of said ring member; and a disc-type filter medium having a diametrical extent, small enough so as to permit said filter medium to be disposed within said ring member and large enough so as to permit said filter medium to rest upon, and be supported by, said ring portion,



whereby smoke is permitted to pass from said smoking bowl into said tube, and liquid filtering medium, said container and out of said opening, while said ash and tobacco material is prevented from passing into said tube and liquid filtering medium.

4,041,961

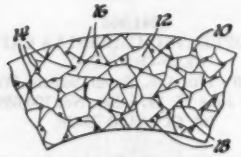
HAIR CURLER WITH SINTERED DESICCANT BODY

Amos J. Shaler, 705 W. Park Ave., State College, Pa. 16801, and Daniel C. McLean, 4029 Alicante, Fort Worth, Tex. 76133

Filed Feb. 9, 1976, Ser. No. 656,549

Int. Cl.² A45D *2/00*

U.S. Cl. 132—40 **9 Claims**



1. A hair treating device adapted to receive a hank of hair, said device including a porous body comprised of an array of granules of desiccant and particles of an organic polymeric binder attached to said granules with certain of said particles bridging between contiguous granules and bonding therebetween at discrete regions throughout the body to form a self-sustaining body, said particles of binder having a smaller size than the desiccant granules, said granules defining interstices which open into each other between said bonded regions for admission of water vapor to the surface of granules in the interior of said porous body, and a cover disposed over the exterior of said porous body, said cover being permeable to water vapor.

4,041,962

IMPLEMENT TO FACILITATE REMOVING BACTERIAL COATING FROM THE INTERSTITIAL AREAS OF ADJACENT TEETH AND CLEANING THE CREVICES THEREBETWEEN

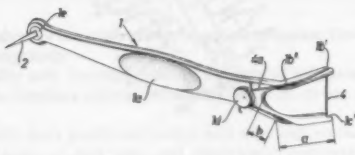
Erik Gunnar Johansson, Sagverksgatan 40, 122 41 Enskede; Bengt Ture Hubertus Blomberg, Artillerigatan 48 nb, 114 45 Stockholm, and Bernt Holger Elmquist, Fribovagen 2 E, 151 44 Sodertalje, all of Sweden

Filed Feb. 26, 1975, Ser. No. 553,419

Claims priority, application Sweden, Feb. 27, 1974, 7402562; Feb. 27, 1974, 7402563

Int. Cl.² A61C *15/00*

U.S. Cl. 132—91 **7 Claims**



1. A tooth cleaning instrument for manual use in removing bacterial coating (plaque) from the interstitial surfaces of adjacent teeth and in cleaning the crevices therebetween, comprising:

an elongate handle with opposite ends arranged for supporting different interstitial cleaning devices, said handle being configured for firm holding by the whole hand of the user outside of the month and for easily swinging either end portion into the mouth and into adjacency with the teeth;

a pair of springy tines extending from one said end of the handle, said tines having fixed end portions coplanar with said handle and extending divergently from the end of said handle, said tines being bent intermediate the ends thereof into a common plane angled from the plane of the handle by an angle of about 5° to 90°, said tines having free ends for support of a dental floss in tension therebetween;

a fastening device on said handle adjacent said tines for holding opposite end portions of said dental floss;

an elongate and triangular cross-section toothpick having woodlike tooth cleaning surfaces;

means for supporting said toothpick for rotation and limited off-perpendicular movement with respect to said handle and locating a transverse hole at the other end of said handle, said toothpick being frictionally and removably engaged in said hole substantially at right angles to the plane of said handle;

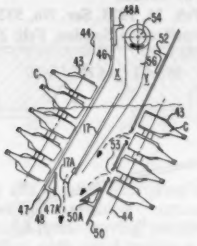
said handle being flat and platelike with a shallow, rounded thumb recess intermediate its ends, said thumb recess and fastening device being on one side of said handle and spaced longitudinally apart and said tines extending away from the opposite side of said handle, said means rotatably supporting said toothpick including an aperture in said other handle end and a bushing member rotatably mounted in said aperture, said bushing member having said pick hole extending therethrough so as to enable at least circumferential self-orientation of the triangular cross-section pick on contact thereof with teeth without need for reorientation of the handle, said divergent bent tines and said one handle end cooperatively forming a cradle of sufficient width for insertion of a finger of the user, said cradle and recess assisting reliable gripping of said handle by the hand of the user for cleaning guidance of said toothpick, said tines carrying substantially helically disposed tracks each defined by a pair of raised ridges separated by a floss groove, which tracks extend divergently along said one side of said tines to the bend zones thereof and terminate in the oppositely facing outboard edges of said tines short of the free ends of said tines, so as to direct floss from said fastening means to the free ends of tines and also reinforce each said tine in its own plane.

4,041,963

CONTAINER WASHER APPARATUS

Momir Babunovic, Des Peres, Mo., assignor to Barry-Wehmiller Company, St. Louis, Mo.

Filed July 30, 1976, Ser. No. 710,166
Int. Cl.[2] B08B *3/04*
U.S. Cl. 134—104 **12 Claims**



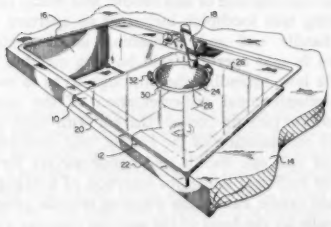
1. In apparatus for washing containers and removing labels therefrom, comprising: a washing tank containing washing solution; container conveyor means directed through said tank in a path having down and up passes joined in a looped pass spaced above the tank bottom, said conveyor means having container pockets open at opposite ends with the pockets aligned in rows transversely of the direction of travel along said path; fixed retainer means following the path of travel of said conveyor in position to retain the containers in the pockets; washing solution agitator means operably mounted adjacent said tank and extending downwardly into the washing solution in the upper zone thereof, said agitator means being movable alternately back and forth between said retainer means to establish flow of washing solution over the containers and through the container pockets; and washing solution flow control means cooperating with said agitator means and being located in position to force the washing solution to flow downwardly in said tank toward said looped pass of said conveyor means, whereby said flow of washing solution over the containers and through said pockets follows the alternate movement of said agitator means away from said container retainer means to effect label removal inwardly between said down and up passes of said conveyor means.

4,041,964

KITCHEN CUTTINGBOARD

Ellis Shamoon, 3618 Gillespie, Suite 109, Dallas, Tex. 75219

Filed June 21, 1976, Ser. No. 697,833
Int. Cl.[2] B08B *3/02*
U.S. Cl. 134—115 R **10 Claims**



1. A cuttingboard for use in kitchens in the preparation of foods, which cuttingboard is adapted for secured positioning by a person over a kitchen sink and countertop area beneath the arcuate path of rotation of a sink faucet, said cuttingboard comprising:

a planar cutting surface adapted for generally horizontal positioning over a kitchen sink and having an aperture formed therein for open-ended communication with the sink area therebelow;

a frontal flange depending from the front edge of said cutting surface and generally perpendicular thereto for abutting engagement against the kitchen sink countertop area with a person leaning thereagainst for stabilized positioning thereon;

said cutting surface and frontal flange being adapted for positioning over the sink with said aperture disposed immediately under a portion of the arcuate path of rotation of the sink faucet; and

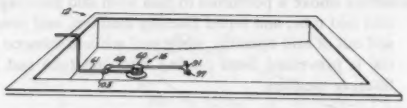
a removable basket adapted for secured positioning in said aperture and beneath the sink faucet for holding foods prepared on said cutting surface for the washing thereof.

4,041,965

POOL CLEANING DEVICE

Jeffrey P. Rosenberg, 1270 Stillwater Drive, Miami Beach, Fla. 33141

Filed Oct. 16, 1975, Ser. No. 622,899
Int. Cl.[2] B08B *3/02, 9/08*
U.S. Cl. 134—167 R **9 Claims**



1. A pool cleaning device comprising:

a debris receptacle trap having an upper end, a lower end and an axially extending side wall,

said side wall including a truncated cone-shaped ramp-type deflector surface extending from said lower end upwardly and inwardly toward said upper end and toward a plurality of outwardly facing mouths in the wall to direct a flow of water and debris toward the device into the receptacle trap,

a radially extending tubular arm,

means rotatably connecting the arm to the housing for rotation with respect to the axis of the housing,

means to connect the column of said arm in fluid communication with a source of water, and

a water jet assembly supported distally on the tubular arm radially spaced outwardly from the housing and having

a radially inwardly facing opening to direct water flow toward the housing, and

a generally tangentially facing opening to cause the arm to turn about the axis of the receptacle trap.

4,041,966

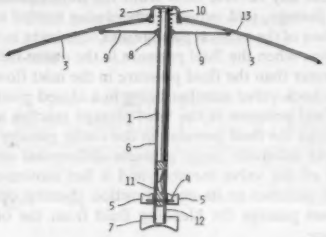
ONE HAND OPERATED UMBRELLA CAPABLE OF SELF-OPENING

Seiya Sakurai, 210 - 17th Ave., South, Seattle, Wash. 98144

Filed June 25, 1976, Ser. No. 700,059
Int. Cl.[2] A45B *25/16*
U.S. Cl. 135—22 **1 Claim**

1. A one hand operated umbrella comprising: an inner shaft, an upper hub member secured to the top of the inner shaft, a plurality of ribs each supporting an umbrella cloth and pivotally engaged at one end to the circumference of the upper hub member, a pin through and secured to the lower end of the inner shaft, two symmetrical upper handle grips securely attached to the pin, a tubular outer shaft concentrically and slidably mounted on the inner shaft and having at lower end dual longitudinal slots for the pin protrusions, a lower handle grip secured to the bottom of the tubular outer shaft, a lower hub member secured to the top of the tubular outer shaft, a plurality of rib-supporting spokes each pivotally engaged at one end of the lower hub member and at the other end to the intermediate portion of the ribs, a compression spring means

mounted on the inner shaft between the upper hub member and the lower hub member and forcing the pin in the inner shaft against the top portions of the dual longitudinal slots in the tubular outer shaft, thereby stabilizing the umbrella in open configuration, and when the upper handle grips are squeezed down against the force of the compression spring means to contact the lower handle grip to create simultaneously to the ribs inward and downward moments caused by radially differ-



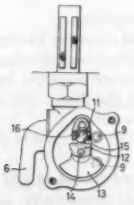
ential inside support pivots on the ribs and the rib-supporting spokes moving in different paths to close the umbrella, a latch means provided in the lower portion of the inner shaft protrudes out and prevents the inner shaft from moving up thus retains the umbrella in closed configuration, whereby, upon pressing and releasing the latch means, the inner shaft is caused to move upward by the compression spring means and creating outward moment of the ribs, thereby automatically opening the umbrella.

4,041,967

APPARATUS FOR PREVENTING FUEL FROM LEAKING ON TURNOVER OF A VEHICLE

Tsuneo Tsukisaka, Kawagoe, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 10, 1976, Ser. No. 685,047
Claims priority, application Japan, May 14, 1975, 50-56022
Int. Cl.² F16K *17/36*
U.S. Cl. 137—39 **3 Claims**



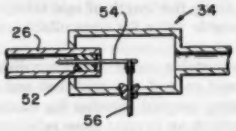
1. An apparatus for preventing fuel from leaking on accidental turnover of a vehicle, the latter having a fuel tank, a carburetor, and a passage communicating said tank with said carburetor; the apparatus comprising an ordinarily open safety valve such as a ball valve interposed in said passage, so arranged that, on the turnover of the vehicle, a pendulum-type weight detects the inclination of the vehicle, operating a cam to automatically close said safety valve; a manually operable fuel cock interposed in said passage, and a housing for said valve integrally formed therewith on one side thereof.

4,041,968

QUICK COOLING CRYOSTAT VALVE

J. Stanley Buller, Santa Barbara, Calif., assignor to Santa Barbara Research Center, Goleta, Calif.

Division of Ser. No. 532,355, Dec. 13, 1974, Pat. No. 3,952,543.
This application Feb. 2, 1976, Ser. No. 654,421
Int. Cl.² B67B *7/00*
U.S. Cl. 137—74 **2 Claims**



1. A valve for the control of cryogenic refrigerant flow, said valve comprising:

a metallic tube for connection to a source of refrigerant gas under pressure and electrically connectable to one potential;

a metallic wire positioned within said tube and spaced from the walls of said tube and electrically connectable to another potential;

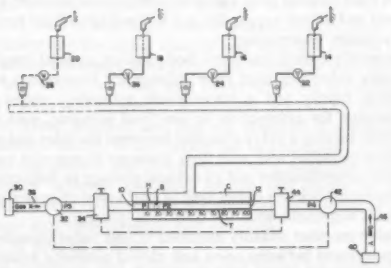
an electrically conductive fusible sealant plug annularly positioned around said wire and in said tube and sealed to both said wire and said tube to prevent the flow or refrigerant gas through said tube, said plug being of such material that it is thermally degraded when an electrical pulse is applied between said wire and said tube by electric current flowing through said plug material to heat the material to degradation so that upon degradation of the plug pressurized refrigerant gas can flow through said tube.

4,041,969

APPARATUS FOR CONTROLLING THE VOLUMETRIC RATIO BETWEEN MIXED GASES

Byron Hillen Acomb, and Roger Joseph Dolida, both of Florence, S.C., assignors to Union Carbide Corporation, New York, N.Y.

Filed Apr. 8, 1975, Ser. No. 566,135
Int. Cl.² G05D *11/00*
U.S. Cl. 137—88 **1 Claim**



1. Apparatus for adjustably controlling the volumetric ratio between two or more gases independent of the total mixed flow rate comprising:

an elongated hollow porous tube;

a ball freely moveable within said porous tube between the opposite ends of said tube respectively;

a source of a first gas;

means for supplying said first gas to one end of said tube;

means for regulating the delivery pressure of said first gas at a predetermined location with respect to said one end of the tube;

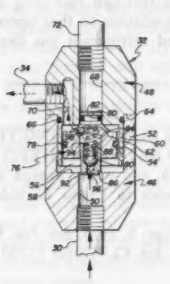
a source of a second gas;
means for supplying said second gas to the opposite end of the tube;
means for regulating the delivery pressure of said second gas at the regulated delivery pressure of said first gas and at a location with respect to the opposite end of the tube such that the pressure differential between the regulated pressure of each gas and the pressure on each side of the ball is maintained essentially equal for a predetermined ball location along the length of said tube;
a first adjustable valve for controllably restricting the flow of said first gas;
a second adjustable valve for controllably restricting the flow of said second gas, said first and second adjustable valves being coupled together for common adjustment so as to establish an inverse flow relationship between said first and second gases;
a chamber surrounding said porous tube for receiving and mixing the gas flow from said tube and having an output for delivering the mixed gases; and
means connected to the output of said chamber for adjusting the total mixed gas flow rate.

4,041,970

QUICK BLEED EXHAUST VALVE

Clifford M. Peters, Longview, Tex., assignor to ACF Industries, Incorporated, New York, N.Y.

Filed June 9, 1976, Ser. No. 694,510
Int. Cl.² F16K *45/00*
U.S. Cl. 137—102 **3 Claims**



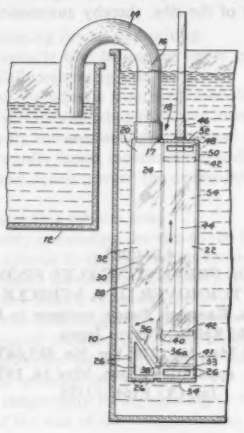
1. A fluid exhaust pilot valve for connection between a fluid actuator and a fluid supply for quick bleeding of fluid from the fluid actuator comprising:
a generally cylindrical valve body having an axial longitudinally extending inlet flow passage for connection to the fluid supply and a transversely extending outlet flow passage for connection to the fluid actuator, said valve body having a valve chamber between the inlet and outlet flow passages with said flow passages at opposite ends of the valve chamber and an exhaust passage in fluid communication with the outlet side of said valve chamber and in axial alignment with the inlet flow passage;
a valve member slidably mounted in said valve chamber for movement between open and closed positions relative to said exhaust passage and exposed on opposite sides thereof to inlet and outlet fluid pressures, said valve member having a large diameter cylindrical main body, a small diameter cylindrical extension extending axially from the main body, and a generally frusto-conical intermediate connecting portion between the extension and the main body;
said valve chamber having opposed annular abutments on which said valve member is seated at said open and closed positions, said valve member having a central bore extending from one end of the main body to said intermediate portion and an outlet opening through said intermediate portion to the valve chamber to provide fluid communication between the central bore and the valve chamber, said small diameter extension fitting within the exhaust passage in the closed position of said valve member to block fluid flow thereto and said intermediate portion of the valve member being seated on an end of the valve chamber and permitting fluid communication between the outlet opening and said outlet flow passage at said closed position;
a check valve member in said central bore to permit fluid flow from said inlet passage to said outlet passage and to prevent any reverse flow from the outlet passage to the inlet passage, said valve member being moved to a closed position of the exhaust passage and remaining in the closed position when the fluid pressure in the outlet flow passage is greater than the fluid pressure in the inlet flow passage, said check valve member being in a closed position when the fluid pressure in the inlet passage reaches an amount less than the fluid pressure in the outlet passage to permit a rapid relatively large pressure differential on opposite sides of the valve member and a fast movement of the valve member to its open position thereby opening the exhaust passage for bleeding fluid from the outlet flow passage.

4,041,971

SIPHON STARTING DEVICE

Robert Newsteder, South Orange, N.J.

Filed Dec. 15, 1975, Ser. No. 640,404
Int. Cl.² F04F *10/00*
U.S. Cl. 137—148 **11 Claims**



1. A siphon device comprising:
an enclosed longitudinal chamber having outer walls and an intermediate longitudinal wall dividing said chamber into first and second separate adjacent longitudinal sections, and a passageway at the lower end of said intermediate wall between said sections;
means providing an outlet for liquid at the upper end of said first section;
a valve pivotally secured across an end of said passageway to open and close said passageway, said valve contacting said intermediate wall in the closed position to block said passageway between said sections;
means for admitting said liquid into said first and second sections including an opening in the lower end of said first section; and
a movable longitudinal rod extending through the upper end of said chamber into said second section and having a lateral plunger at the lower end of said rod adapted to direct liquid from said second section into said first section through said passageway and open said valve upon downward movement of said rod and plunger, said valve con-

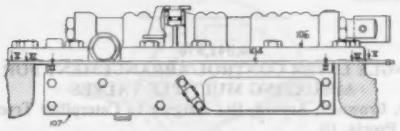
tacting an outer wall of said first section in the open position to block said opening in said lower end of said first section.

4,041,972

HYDRAULIC STACK VALVE ASSEMBLY

Joseph R. Hoepfl, Greenfield, and Gerardus M. Ballendux, Waukesha, both of Wis., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Aug. 4, 1976, Ser. No. 711,649
Int. Cl.[2] F15B *13/02*; F16K *11/10*
U.S. Cl. 137—269 10 Claims



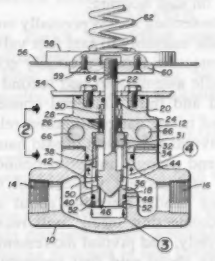
1. A hydraulic stack valve assembly comprising, a valve body, a valve cover and a flow director plate selectively and alternately positioned intermediate said valve body and said valve cover, means removably fastening said valve assembly together, inlet passage means in said valve assembly adapted for connection to a source of pressurized fluid, hydraulic actuator passage means in said valve assembly adapted for connection to at least one hydraulic actuator, sump passage means in said valve assembly adapted for connection to a sump, said valve body defining a plurality of flow control valves, a valve spool in each of said flow control valves, at least one of said valve spools defining lands and grooves for controlling fluid flow in said flow control valve, said valve cover including a pressure regulator valve and a pressure modulating valve to control the fluid pressure in said valve, connecting passage means in said valve body connecting said flow control valves, joining passage means joining said valves in said valve cover, said flow director plate defining openings permitting fluid flow between portions of said connecting passage means and said joining passage means of said valve assembly, actuating means selectively operating said flow control valves for selective communication with said hydraulic actuator.

4,041,973

QUICK CHANGE VALVE TRIM ASSEMBLY

Donald D. Rice, and Herbert H. Walton, both of Marshalltown, Iowa, assignors to Fisher Controls Company, Marshalltown, Iowa

Filed May 2, 1975, Ser. No. 574,176
Int. Cl.[2] F16K *43/00*
U.S. Cl. 137—315 5 Claims



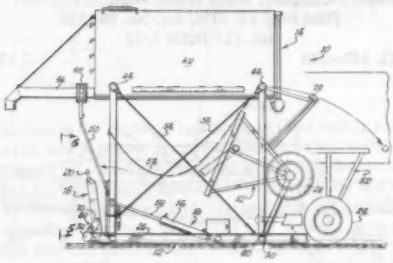
1. A valve trim structure, comprising:
a unitary cage member having an inner surface and an outer surface, and a valve seat on said inner surface,
a plug member received within said cage member and reciprocable therein toward and away from said seat;
a stem member having a first end affixed to said plug member and having a second end extending out of one end of said cage member;
means for preventing relative rotation of said cage and said plug and stem members,
said second end of said stem being threaded for attachment to actuator means external of a valve; and
a valve bonnet;
said one end of said cage member from which said stem member extends being threaded for attachment to said valve bonnet;
whereby by turning said cage member, said threaded end of said cage member is affixed to said valve bonnet, while said stem member and said plug member are simultaneously turned by said cage member to affix said second end of said stem member to said external actuator means.

4,041,974

MOBILE TOWER

Keril M. Keiser, 409 N. Washington Ave., Glendora, Calif. 91740

Filed Feb. 23, 1976, Ser. No. 660,422
Int. Cl.[2] B60P *3/22*
U.S. Cl. 137—344 6 Claims



5. A mobile tower comprising:
a base frame having front and rear ends and upper and lower sides,
a hinged collapsible tower structure on said frame including front and rear supporting legs at the front and rear ends of said frame having normally upper and lower ends, a connecting member extending between the upper ends of said legs, pivotal connections between said frame and the lower ends of said legs, pivotal connections between said member and the upper ends of said legs, said pivotal connections having parallel pivot axes extending transversely of said frame, whereby said tower structure is swingable forwardly and upwardly to an erect position of use over said frame wherein said legs are disposed in upstanding positions relative to said frame and said structure is swingable rearwardly and downwardly to a collapsed towing position wherein said legs incline rearwardly of said frame, and actuator means for effecting movement of said tower structure between said positions,
a pair of ground wheels,
means mounting said wheels on said frame for supporting contact of said wheels with the ground when said tower structure is collapsed to permit towing of said tower by a vehicle having a trailer hitch,
a hitch tongue at the front end of said frame including coupling means for releasable engagement with said vehicle trailer hitch,
means mounting said tongue on said frame for movement between extended and retracted positions in a manner such that when said tower is disposed in towing relation behind said vehicle said tongue coupling means is engageable with said vehicle trailer hitch by extension of said tongue and said coupling means is disengageable from said hitch by retraction of said tongue, said tongue mounting

means comprising a first arm swingable mounted at one end on the front end of said frame on a pivot axis parallel to said supporting leg pivot axes, and means pivotally connecting the other end of said arm to said tongue between the tongue ends on a pivot axis parallel to said leg pivot axes,

connecting means joining said tongue and tower structure for retraction of said tongue by elevation of said tower structure to its erect position and extension of said tongue by lowering of said tower structure to its collapsed position, and

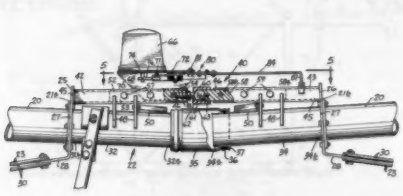
said tongue undergoing downward extension movement and upward retraction movement relative to said frame in a manner such that retraction of said tongue with said coupling means engaged with said vehicle hitch effects upward disengagement of said coupling means from said hitch and extension of said tongue effects downward engagement of said coupling means with said hitch.

4,041,975

ARTICULATING PIPE COUPLING AND ALIGNMENT CONTROL ASSEMBLY FOR CENTER PIVOT IRRIGATION SYSTEM

Kenneth R. Ames, Walla Walla, Wash., assignor to Frontier Machinery Company, Walla Walla, Wash.

Filed May 14, 1976, Ser. No. 686,530
Int. Cl.[2] B05B *3/12*
U.S. Cl. 137—344 **7 Claims**



1. In a center pivot irrigation system having an elongated water distribution conduit supported at intervals by mobile towers for transporting the conduit over a field, in which the conduit is comprised of conduit sections that are pivotally interconnected to each other by articulating pipe coupling and alignment control assemblies and supported between mobile towers by truss structures; each of said articulating pipe coupling and alignment control assemblies comprising:

two longitudinally spaced pipe segments having diameters complementary to the conduit sections;

articulating pipe coupling interconnecting adjacent inner ends of the pipe segments for fluidically interconnecting the pipe segments in a sealed relationship and for enabling each pipe segment to pivot vertically and horizontally with respect to the other pipe segment;

conduit section flanges that are affixed to outer ends of pipe segments, each conduit section flange having, (1 1) an upper portion attached to the ends of the conduit sections; and (2) a lower portion that extends downwardly below the conduit sections attaching to the truss structure;

an external pivot connection subassembly for operatively structurally interconnecting the conduit sections to enable each conduit section to angularly move both horizontally and vertically with respect to each other without interferring with the flow of liquid through the pipe segments;

said external pivot connection subassembly having two opposed longitudinally aligned support tubes affixed to and vertically above the pipe segments;

said external pipe connections subassembly having ball and socket articulating means between support tubes with shafts extending into and affixed to respective tubes, said articulating ball and socket means having a ball and socket located vertically above the pipe coupling for enabling the attached conduit sections to pivot horizontally about a vertical axis defined by the ball and socket;

a support bracket mounted on one of the tubes and extending over the one tube;

an alignment control box mounted to the support bracket;

an alignment arm subassembly pivotally mounted to the support bracket for pivotal movement about the vertical axis of the ball and socket; and

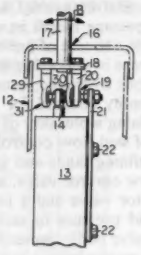
said alignment arm subassembly having an arm section extending horizontally from the vertical axis over to and engaging the other support tube to cause the alignment control subassembly to pivot about the vertical axis in response to angular movement between attached conduit sections.

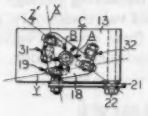
4,041,976

SINGLE LEVER CONTROL ARRANGEMENT FOR ACTUATING MULTIPLE VALVES

Roy D. Brownell, Aurora, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 1, 1975, Ser. No. 636,510
Int. Cl.[2] F16K *11/18*; G05G *9/04*
U.S. Cl. 137—351 **10 Claims**





1. A control arrangement comprising

a housing,

a pair of first and second valve spools reciprocally mounted in said housing,

a handle assembly comprising a horizontally disposed plate having an upstanding handle secured thereon,

first universal connecting means pivotally mounting said handle assembly on said housing,

second universal connecting means pivotally connecting the plate of said handle assembly to said first valve spool, and

third universal connecting means pivotally connecting the plate of said handle assembly to said second valve spool, said first, second and third universal connecting means disposed in spaced triangular relationship relative to each other whereby pivotal movement of said handle assembly about said first and second universal connecting means will reciprocate said second valve spool only, pivotal movement of said handle assembly about said first and third universal connecting means will reciprocate said first valve spool only, and pivotal movement of said handle assembly only about said first universal connecting means will reciprocate said first and second valve spools simultaneously, said handle disposed centrally on said plate and at least substantially within and between imaginary lines defining the triangular disposition of said first, second and third universal connecting means, said first, second and third universal connecting means cooperating

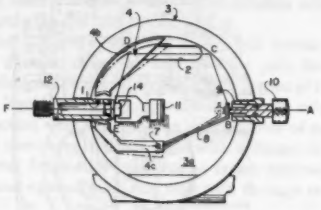
for substantially preventing rotation of said first and second valve spools and said handle assembly about their respective axes.

4,041,977

BREATHING APPARATUS FLOW REGULATOR

Takayoshi Matsuno, 1-10 Sumadera-cho, 2-chome, Suma, Kobe, Japan

Filed Aug. 4, 1975, Ser. No. 601,536
Int. Cl.² F16K *31/126*
U.S. Cl. 137—494 4 Claims



1. A device for regulating the flow of breathing gas mixtures, comprising a rectangular housing having an interior cylyindrical wall and a circular back wall with an elongated slot formation therein forming an inhalation discharge port, an inlet port in said cylindrical wall for the inflow of breathing gas into said housing spaced apart from said discharge port, a double armed baffle pivotally mounted in said housing and pivotable on said circular back wall and having a first arm facing said back wall defining a breathing gas flow space between said baffle and said back wall and also having a portion covering a part of said inhalation discharge port and a second arm connected to said first arm, said inlet port being adjacent one end of said gas flow space and said discharge port being adjacent the opposite end and partially in communication with said gas flow space, adjusting means displaceably mounted on said housing wall and connected to said baffle second arm for positioning said baffle first arm relative to said interior cylindrical wall, said first arm being pivotable by said adjusting means toward said wall to reduce the flow space area and cause a major portion of the air flow from said inlet port to flow directly into the portion of said discharge port which is covered by said first arm, said first arm being pivotable away from said wall to increase the area of the flow space and allow the gas flow from the inlet port to pass the discharge port and to be deflected by said housing interior wall around the housing and thereafter to flow indirectly into the portion of said discharge port which is not covered by said first arm.

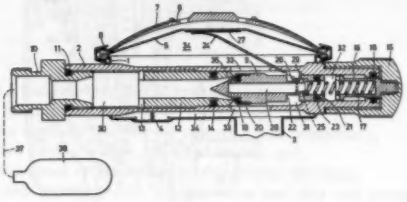
4,041,978

PRESSURE REGULATOR FOR BREATHING APPARATUS

Karl Leemann, Zurich, Switzerland, assignor to Scubapro EU, Zurich, Switzerland

Filed Jan. 13, 1976, Ser. No. 648,717
Claims priority, application Switzerland, Jan. 20, 1975, 625/75
Int. Cl.² F16K *31/38*
U.S. Cl. 137—494 1 Claim

1. A pressure regulator for breathing apparatus comprising:
a source containing a gaseous mixture;
a diaphragm case having an interior space;
a diaphragm disposed in said diaphragm case;
a valve housing disposed in said diaphragm case;
a movable valve body disposed in said valve housing and cooperable with a valve seat of said housing for opening and closing said regulator;
a control member for moving said valve body as a function of the position of said diaphragm with respect to said diaphragm case;
said valve housing being divided by said valve body, when said regulator is closed thereby, into a first chamber adapted to communicate with said gaseous mixture source, a second chamber communicating with said interior space of said diaphragm case, and a third chamber communicating with said first chamber;
said valve housing additionally comprising spaced first and second sealing surfaces;
said valve body comprising spaced third and fourth sealing surfaces respectively cooperating with said first and second sealing surfaces for sealing off said first chamber from said second chamber and said second chamber from said third chamber when said regulator is closed by said valve body;
a conical portion of said valve body extending into said first chamber beyond said first and third sealing surfaces and the base portion of which has a diametrical extent substantially equal to that of said valve seat so as to cooperate therewith for producing a laminar flow of said gaseous



mixture in the region of said first and third sealing surfaces when said regulator is opened by said valve body;
a channel, by which said third chamber communicates with said first chamber, disposed in said valve body and opening into said first chamber, from said conical portion in the vicinity of said base portion of said conical portion and said first and third sealing surfaces, at right angles to the direction of flow of said gaseous mixture in said first chamber for producing a lower pressure in said third chamber than exists in said first chamber when said gaseous mixture flows from said first chamber into said second chamber; and
the portion of said valve housing, which defines a part of said first chamber and which cooperates with said conical portion of said valve body, includes a portion tapering in the same direction as said conical portion of said valve body for additionally improving the laminar flow of said gaseous mixture in the region where said channel enters said first chamber.

4,041,979

CONTROL VALVE HAVING INDEPENDENTLY DRIVEN VALVES

Karlheinz Grotloh, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed July 19, 1976, Ser. No. 706,195
Claims priority, application Switzerland, July 25, 1975, 9708/75
Int. Cl.² F16K *11/22*
U.S. Cl. 137—599.2 7 Claims

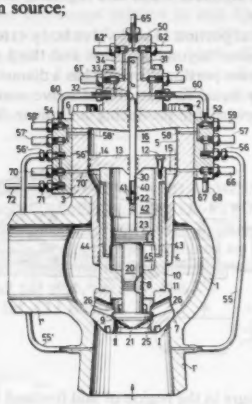
1. A control valve comprising
a housing having at least a pair of spigots for a flow of working medium therethrough and a first valve seat therein;
a main valve including a movably mounted hollow spindle, a first valve body mounted on said spindle for sealingly seating on said first valve seat, said valve body having a passage for a flow of working medium therethrough, and a second valve seat within said first valve body about said passage;
a second valve including a second spindle movably mounted concentrically within said hollow spindle and a second

valve body mounted on said second spindle for sealingly seating on said second valve seat;

a first servo-motor for moving said main valve and including a cylindrical chamber in said housing, and a first piston secured to said hollow spindle and slidably received in said chamber to define two chambers therein;

a second servo-motor for moving said second valve and including a second piston secured to said second spindle and slidably received in said hollow spindle to define two chambers therein;

a first control element for connecting said cylinder chamber of each said servo-motor closest said valve bodies to a pressure medium source;



a second control element for connecting said cylinder chamber of each servo-motor closest said valve bodies to a discharge line;

a third control element communicating said cylinder chambers of said servo-motors remote from said valve bodies to each other;

a fourth control element for connecting said cylinder chamber of said first servo-motor remote from said first valve body to a pressure medium supply; and

a fifth control element for connecting said cylinder chamber of said servo-motor remote from said second valve body to a discharge line.

4,041,980

CONTROL VALVE HAVING TWO INDEPENDENTLY DRIVEN VALVES

Karlheinz Grotloh, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed July 19, 1976, Ser. No. 706,149

Claims priority, application Switzerland, July 25, 1975, 9709/75

Int. Cl.² F16K *11/22*

U.S. Cl. 137—599.2 **7 Claims**

1. A control valve comprising

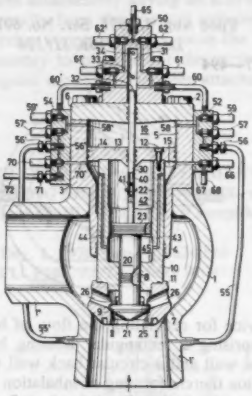
a housing having at least a pair of spigots for a flow of working medium therethrough and a first valve seat therein;

a main valve including a movably mounted hollow spindle, a first valve body mounted on said spindle for sealingly seating on said first valve seat, said valve body having a passage for a flow of working medium therethrough, and a second valve seat within said first valve body about said passage;

a second valve including a second spindle movably mounted concentrically within said hollow spindle and a second valve body mounted on said second spindle for sealingly seating on said second valve seat;

a first servo-motor for moving said main valve and including an insert mounted in said housing and defining a cylindrical chamber, and a first piston secured to said hollow spindle and slidably received in said insert to subdivide said chamber into a pair of chambers;

a second servo-motor for moving said second valve and including a second piston secured to said second spindle and slidably received in said hollow spindle to define two chambers therein;



a rod secured to said second piston and extending through said first piston, said rod having a longitudinal passage communicating one of said chambers within said hollow spindle of said second servo-motor with an end of said rod; and

means mounted on said housing to define a chamber, said latter chamber receiving said end of said rod therein to selectively deliver a pressurized medium to said one chamber and to vent said one chamber.

4,041,981

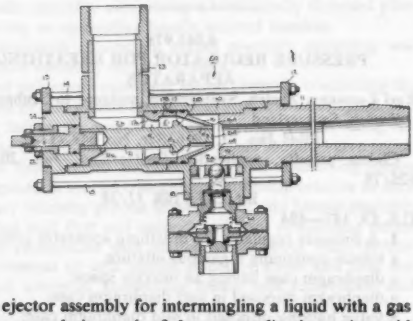
EJECTOR ASSEMBLY

James W. Davis, New Britain, and Garrett H. Hilton, Hatboro, both of Pa., assignors to Fischer & Porter Co., Warminster, Pa.

Filed Apr. 28, 1976, Ser. No. 681,200

Int. Cl.² F16K *19/00*

U.S. Cl. 137—604 **6 Claims**



1. An ejector assembly for intermingling a liquid with a gas to produce a solution to be fed to an application point, said assembly comprising:

A. an ejector body having an elongated tubular throat extending axially therefrom;

B. a nozzle disposed in a cylindrical cavity within said body, the mouth of said nozzle being adjacent the inlet of said throat to define an interaction zone therebetween, the

space in said cavity behind said nozzle defining a liquid input zone;

C. means to feed liquid under pressure into said input zone whereby liquid at high velocity is emitted from the mouth of said nozzle into the interaction zone to create a vacuum, said liquid feed means being at right angles to the longitudinal flow axis of said ejector body to define an elbow rendering the liquid input to said nozzle turbulent;

D. means communicating with said interaction zone and coupled to a gas supply to cause gas to be drawn into said interaction zone by said vacuum to intermingle with the liquid therein and to produce said solution which is discharged through said throat; and

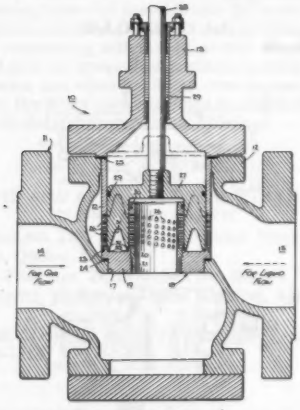
E. a plug coaxially-disposed within said nozzle and said input zone to define an annular flow path having flow disturbances therein imparting a high degree of turbulence to the liquid issuing from the nozzle, thereby enhancing its interaction with said gas, the internal bore of said nozzle being contoured to cooperate with a flange of enlarged diameter formed on said plug to create alternate restrictions and expansions in said flow path through said nozzle.

4,041,982

DOUBLE WALL PLUG CONTROL VALVE

Henry Paul Lindner, Middletown, N.Y., assignor to Kieley & Mueller, Inc., Middletown, N.Y.

Filed Jan. 9, 1976, Ser. No. 647,886
Int. Cl.² F16K *47/14*
U.S. Cl. 137—625.3 **10 Claims**



1. A control valve comprising

a body defining a flow path for a fluid flow, said body including an inlet, an outlet and a valve bridge between said inlet and outlet defining a constricted opening within said path;

a double wall cage mounted within said body coaxially of said valve bridge opening, said cage including a pair of perforated walls disposed in spaced apart concentric relation for passage of a fluid flow therethrough; and

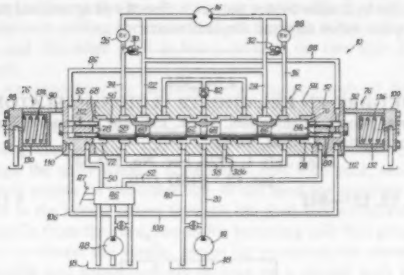
a valve plug reciprocally mounted in said body and located in slidable relation between said walls to control the fluid flow through said flow path from said inlet to said outlet.

4,041,983

PRESSURE CONTROLLED SWING VALVE WITH SAFETY FEATURE

Donald L. Bianchetta, Coal City, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed July 9, 1975, Ser. No. 594,392
Int. Cl.² F15B *13/042*
U.S. Cl. 137—625.63 **3 Claims**



1. In a fluid motor control system for a reversable hydraulic motor having first and second fluid ports,

a pilot operated directional control valve comprising,

a valve having a bore provided therein and,

a valve spool reciprocally slidable within the bore,

first and second motor control ports and first and second motor exhaust ports provided in said housing in communication with said bore.

first motor conduit means for communicating the first motor control port with a first fluid motor port, and second motor conduit means for communicating the second motor control port with a second fluid port in a motor,

pilot pressure reaction chambers provided in the housing facing each opposite end area of the valve spool whereby pilot fluid pressure therein will act upon respective ends of the valve spool,

a pilot control valve in communication with a source of constant pilot pressure for selectively communicating pilot pressure to one of said pilot pressure reaction chambers for selective shifting of the valve spool,

pilot pressure conduit means communicating said pilot control valve with the respective pilot pressure reaction chambers,

a high pressure fluid inlet port provided in the valve body in communication with the bore and with a source of high pressure fluid independent of and separate from said source of pilot pressure,

sump outlet port means provided in the valve body,

and wherein the valve spool is shiftable from a neutral, centered position in which the high pressure fluid inlet port is communicated through the valve bore with the sump outlet port means, to first and second motor control positions respectively in which the high pressure fluid inlet port is communicated with the first and second motor control ports respectively and the first and second motor exhaust ports are communicated with the sump outlet means respectively,

constant force spool biasing means comprising,

first and second biasing piston means slidably disposed in the valve housing at respective opposite ends of the bore abutting the respective ends of the valve spool in its neutral position, and a single one of said first and second biasing piston means engaging said valve spool when it is respectively shifted from its neutral position,

conduit means constantly communicating constant pilot pressure with said biasing piston means,

first and second modulating piston means slidably diposed in the valve housing at respective opp osite ends of the valve spool and abutting the ends of the valve spool,

and first and second modulating conduit means communicat-

ing the first motor control conduit with the second modulating piston means, and the second motor control conduit with the first modulating piston means,

whereby fluid pressure supplied through the control valve and a motor conduit means for driving the motor will be communicated to a modulating piston to urge the valve spool toward closing of the motor conduit means together with the constant pilot pressure bias and against the selected pilot control pressure acting on the spool, whereby the hydraulic motor output is directly proportional to the pilot valve selector displacement.

4,041,984

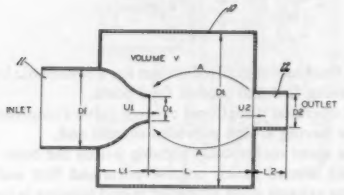
JET-DRIVEN HELMHOLTZ FLUID OSCILLATOR

Thomas Morel, Birmingham, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed July 1, 1976, Ser. No. 701,537

Int. Cl.[2] F15D *1/08*

U.S. Cl. 137—842 **1 Claim**



1. A jet-driven Helmholtz fluid oscillator comprising: a fluid inlet nozzle having a feed duct opening of diameter Df and an inlet opening of diameter **D1**; a fluid outlet coaxially aligned with said inlet and having an opening of diameter D2 and a length **L2**; and a chamber disposed between said inlet and outlet having a volume V, a jet length L measured from the inlet opening to the fluid outlet end of said chamber, a nozzle protrusion length **L1** measured from the fluid inlet end of said chamber to the inlet opening and a diameter Dt, wherein **D1** is within the range of 25.4 mm to 200 mm, the ratio **D2/D1** is within the range 1.0 to 2.1, the ratio **L2/D1** is within the range 0–7.0, the ratio **L/D1** is within the range 0.5 to 7.0, the ratio $V/D1^3$ is within the range 14 to 350, the ratio **Df/D1** is within the range 2.5 to 10.0, the ratio **L1/D1** is within the range 0 to 2.0 and the ratio **Dt/D1** is within the range 4.0 to 8.0, said chamber having a Helmholtz frequency fo whereby when a fluid at a constant flow rate slightly larger than the product Lfo divided by a dimensionless frequency known as the Strouhal number is introduced at the fluid inlet, the fluid will be discharged from the outlet in a fluctuating manner to produce fluid flow and chamber pressure oscillations at a frequency slightly higher than the Helmholtz frequency which would be present with no flow.

4,041,985

WEFT SENSOR SYSTEM OF SENSING MALFUNCTION OF A WEAVING LOOM

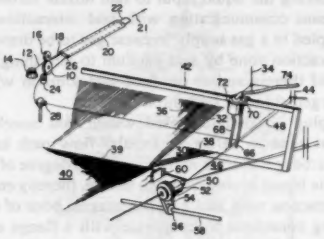
Miyuki Gotoh, Tokorozawa, Japan, assignor to Nissan Motor Company, Limited, Japan

Filed May 7, 1975, Ser. No. 575,135

Int. Cl.[2] D03D *51/34*

U.S. Cl. 139—370.2 **6 Claims**

1. A system for use on a loom for sensing malfunction in a weft sensor of a weaving loom comprising, means to sense a weft yarn for producing an electrical signal in dependence upon said weft yarn having reached a predetermined position upon insertion of said weft yarn in a shed of a weaving loom comprising an electric circuit including therein two electrodes spaced apart from each other, said electric circuit being closed to produce said electric signal when said weft yarn touches both electrodes, a timer circuit connected to said electric circuit to produce an electrical signal representative of malfunction in the weft sensor when said means produces said electric signal for a period of time longer than a predetermined period of time including beat-up time, a NOT circuit connected to receive an output of said timer circuit, means in said timer circuit for producing an output signal when said electric signal is applied thereto from said electric circuit for a period of time



shorter than said predetermined time period and ceasing generation of said output signal when said electric signal is applied thereto from said electric circuit for a period of time longer than said predetermined time period, and said NOT circuit comprising means for producing an output signal for stopping the operation of said loom when said output signal of said timer circuit is absent.

4,041,986

DEVICE FOR FORMING A SHED IN A WEAVING MACHINE

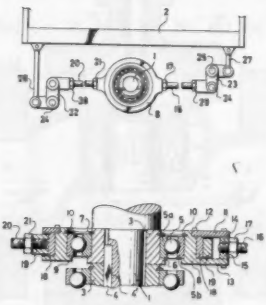
Josef Resch, Rychnov nad Kneznou; Miloslav Kadlec, Tyniste nad Orlici; Stanislav Zahradnik, Roztoky u Jilemnice, and Josef Parizek, Tyniste nad Orlici, all of Czechoslovakia, assignors to Elitex Koncern textilniho strojirenstvi, Liberec, Czechoslovakia

Filed July 16, 1976, Ser. No. 706,058

Claims priority, application Czechoslovakia, Aug. 25, 1975, 5782-75

Int. Cl.[2] D03C *5/02*

U.S. Cl. 139—58 **3 Claims**



1. In a weaving machine having an operatively mounted heald shaft, an arrangement for forming sheds, comprising

a drive shaft rotatably mounted in the weaving machine;

an eccentric non-rotatably mounted on said drive shaft;

a bearing mounted in the eccentric;

a rim member coaxially mounted on the bearing;

a sleeve mounted on said rim member; and

a pair of linkage means operatively connected to the heald shaft;

one of said pair of linkage means being operatively connected to said rim member and the other being operatively connected to said sleeve; whereby the heald shaft is recip-

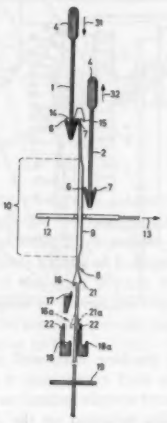
rocated by the drive shaft when the eccentric is rotated by the drive shaft.

4,041,987

JACQUARD MACHINE EQUIPPED WITH LIFTING WIRES AND STATIONARY ARRESTING BLADES

Robert Bucher, Frick, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Aug. 23, 1976, Ser. No. 716,785
Int. Cl.[2] D03C *3/00, 3/08*
U.S. Cl. 139—59 3 Claims



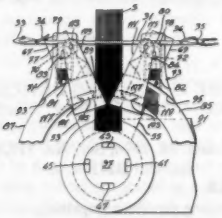
1. In a Jacquard machine having to-and-fro moving lifting wires provided with arresting hooks for coupling the lifting wires with stationary arresting blades, the improvement of a stationary arresting blade for fixing a lower shed position, at least one stationary guide edge provided at the region of said stationary arresting blade, a lifting wire neighboring said stationary arresting blade and movable into the lower shed position, a projection provided at said neighboring lifting wire, said guide edge cooperating with said projection when the lifting wire travels into the lower shed position, in order to deflect said lifting wire, and when the lifting wire assumes the lower shed position the lifting wire is coupled by means of its arresting hook with the stationary arresting blade.

4,041,988

METHOD AND APPARATUS FOR WEAVING AN ELONGATED FABRIC

Morris Benzakein, 2130 Bordeleau, Paroisse Notre Dame, St. Hyacinthe, Quebec, Canada

Filed Apr. 29, 1976, Ser. No. 681,405
Claims priority, application United Kingdom, Apr. 29, 1975, 17739/75
Int. Cl.[2] D03D *49/50, 47/42;* A44B *19/42*
U.S. Cl. 139—116 9 Claims



1. A method for forming a continuous fabric having parallel edges, including the steps of providing a plurality of warp yarns and inserting alternately from each side of the shed double picks of a pair of weft yarns taken from a stationary weft supply on either side of the shed and interlacing the loops along the edges of the web so formed to form a chain stitch at both edges, providing a pair of mock warp yarns in the shed near one side edge of the web, and locating at least a monofilament, which has been prescored to form a part of a zipper, as a warp adjacent the mock warp yarn inwardly thereof and successively pulling the monofilament through the mock warp yarn and the edge as it is being formed on one side edge thereof.

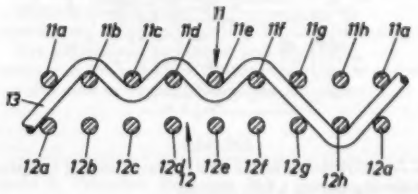
4. An apparatus for weaving a continuous web of fabric having parallel side edges, including a double headed latch needle, a first gripper means on one side of the shed path for gripping the needle, and passing said needle transversly through the shed while it is pulling a first weft pick, second gripping means on the other side of the shed for gripping the needle as the needle passes through the shed and withdrawing the needle from the shed, means for actuating said first gripper means to release the needle, means for reversing the travel of the needle and simultaneously picking up a second weft pick while releasing the first weft pick, said second gripping means passing the needle transversely through the shed in the opposite direction while pulling the second weft pick through the loop formed by the first weft pick.

4,041,989

FORMING FABRIC AND A METHOD FOR ITS MANUFACTURE

Arne Boris Johansson, Halmstad; Francisco Lorente Codorniu, Aled, both of Sweden, and Ingvald Strandly, Oslo, Norway, assignors to Nordiska Maskinfilt Aktiebolaget, Halmstad, Sweden

Filed Sept. 30, 1975, Ser. No. 618,067
Claims priority, application Sweden, Oct. 10, 1974, 7412722
Int. Cl.[2] D03D *15/00, 15/02;* B21F *1/10;* B10D *39/08*
U.S. Cl. 139—425 A 16 Claims



1. An improved method of manufacturing forming fabrics intended for use in paper-making, cellulose or similar machines including the steps of providing two layers of synthetic weft threads and synthetic warp threads, said warp threads interconnecting said weft thread layers and additionally binding separately with the weft threads of the upper layer which, during the position of use of said fabric faces the material to be formed, and including the further improvement of arranging each one of said warp threads in such a manner that it binds with at the most every sixth thread of the layer of weft threads which in position of use of said fabric faces the dewatering elements of said machine, and stretching said warp threads so as to make said second weft thread layer which in the position of use of said fabric faces said machine dewatering elements tangent to a first plane positioned outside a second plane, said second plane being tangent to said warp threads interconnecting said weft layers.

10. An improved forming fabric comprising first and second layers of synthetic weft threads and a layer of synthetic warp threads interconnecting said weft thread layers anf additionally binding separately with the weft threads of said first layer

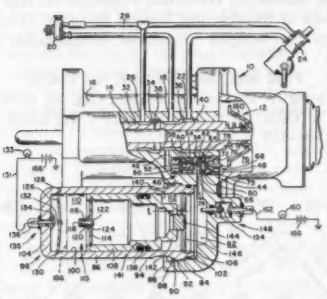
which during the position of use of said fabric faces the material to be formed, the improvement comprising said second weft thread layer which faces the machine dewatering element during position of use of said fabric, being tangent to a first plane positioned outside a second plane, said second plane being tangent to said warp threads interconnecting said weft layers, and said weft threads forming pairs, each warp thread binding in sequence between a first pair of weft threads, above a second pair of weft threads, between a third pair of weft threads, above a fourth pair of weft threads, between a fifth pair of weft threads, above a sixth pair of weft threads, between a seventh pair and beneath an eighth pair of weft threads before the procedure is repeated.

4,041,990

ACCUMULATOR FOR USE IN A HYDRAULIC SYSTEM

Louis S. Tang, Windsor, Canada; Dean E. Runkle, LaPorte, and Lloyd G. Bach, South Bend, both of Ind., assignors to The Bendix Corporation, South Bend, Ind.

Filed Apr. 5, 1976, Ser. No. 673,831
Int. Cl.² F16L *53/00*
U.S. Cl. 138—31 **10 Claims**



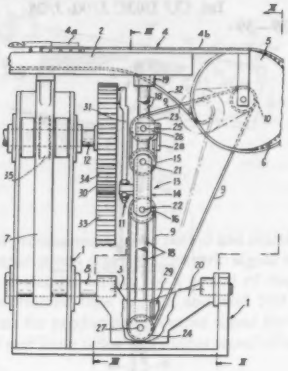
1. An accumulator for use in a hydraulic system comprising:
a housing having a bore therein;
piston means located in said bore for establishing a boost chamber and a hydraulic chamber, said boost chamber retaining a fixed volume of a compressible fluid, said hydraulic chamber being connected to a source of hydraulic fluid under pressure in said hydraulic system, said compressible fluid escaping from said boost chamber and replaced with hydraulic fluid from the hydraulic chamber after a period of time, said hydraulic fluid in said boost chamber being responsive to thermal energy to create a thermal hydraulic pressure, said thermal hydraulic pressure moving said piston means toward said hydraulic chamber; and
plug means attached to said piston means, said plug means being sheared from said piston means upon engagement with said housing through a predetermined movement of said piston means in said hydraulic chamber by said thermal hydraulic pressure to establish a flow path between said boost chamber and said hydraulic chamber to allow the hydraulic fluid in said boost chamber to be freely communicated to the hydraulic chamber and to thereby dissipate said thermal hydraulic pressure therein without damage to said housing.

4,041,991

WEAVING MACHINE WITH EXTERNAL WEFT SUPPLY

Raymond Dewas, Amiens, France, assignor to Control Drug, Inc., Port Reading, N.J.

Filed June 22, 1976, Ser. No. 698,535
Claims priority, application Luxembourg, June 24, 1975, 72791; Oct. 13, 1975, 73576
Int. Cl.² D03D *47/00*
U.S. Cl. 139—449 **8 Claims**



1. In a weaving machine with weft supplied from spools located outside the shed comprising a stationary frame, an oscillating slay, spaced swords located on opposite sides of said slay, vertical heddles mounted on the stationary frame and serving to move the warp threads, a weft inserter horizontally displaceably mounted on said slay, a driving wheel arranged for imparting movement of said weft inserter, said driving wheel mounted to be reciprocally rotated, a first pulley coupled to said driving wheel for reciprocally rotating said driving wheel, support means attached to said slay, a pair of spaced guiding pulleys secured on said support means, a toothed belt having the opposite ends thereof anchored, said toothed belt between the anchored ends thereof passing over said guiding pulleys and being in driving engagement with said first pulley, a driving means in engagement with said toothed belt for imparting reciprocal movement thereto, wherein the improvement comprises that said driving means includes a belt driving carriage mounted on said support means and reciprocally movable in the substantially vertical direction and arranged in engagement with said toothed belt for transmitting the reciprocal vertical movement thereto, a horizontal shaft extending transversely of the vertical direction of movement of said carriage and having a fixed axis extending parallel to the direction of movement of said weft inserter and said shaft positioned between said swords and said vertical heddles and arranged in cooperation with said swords for imparting oscillatory movement to said slay, a crank disk supported on said shaft, and a crank-arm eccentrically articulated at one point thereon to said crank disk and articulated at another point spaced from said one point of said carriage for moving said carriage in the vertical direction.

4,041,992

WIRE TIGHTENING DEVICE

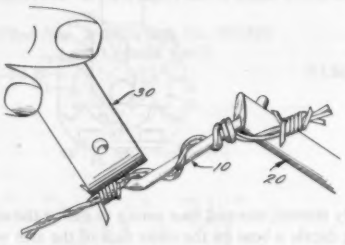
Paul R. Lynn, 1302 N. Tennessee Blvd., Murfreesboro, Tenn. 37130

Filed Aug. 24, 1976, Ser. No. 717,399
Int. Cl.² B21F *9/00*
U.S. Cl. 140—123.5 **7 Claims**

1. A wire tightening device comprising:
link means with one end portion bent at substantially 60° relative to a main body portion and another end portion bent at substantially 90° relative to the main body portion

and substantially 90° counter clockwise from the plane containing the bend of said one end portion, said other end portion having a further bend of substantially 20° in the same plane as and 90° clockwise to, the 90° bend in the other end portion;

first handle means having a hole defined through one end portion thereof with a diameter sufficient to permit the



one end portion of the link means to be inserted therein and extend through the first handle means so as to be removably disposable thereon; and

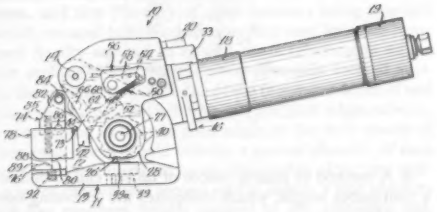
second handle means having an L-shaped end portion with a hole defined in the foot portion thereof and having a diameter sufficient to permit the other end portion of the link means to be inserted therein and extend through the foot portion so as to be removably disposable thereon.

4,041,993

STRAP TENSIONER WITH AUTOMATIC CUT-OFF

Barry R. Angarola, Schaumburg, Ill., assignor to Signode Corporation, Glenview, Ill.

Filed Mar. 7, 1975, Ser. No. 556,268
Int. Cl.² B21F *9/00*
U.S. Cl. 140—123.6 **13 Claims**



1. A strapping tool for tensioning and cutting strap comprising a frame;

a pivot shaft on said frame;

a tensioning assembly pivotally mounted on said pivot shaft and including a motor means having an output shaft and a rotatable tensioning wheel operably connected to said output shaft and adapted to engage an underlying portion of a strap so as to tension said strap when the tensioning wheel is rotated in a tensioning direction;

ratchet wheel means operably connected to said output shaft and driven simultaneously with said tensioning wheel;

pivotally mounted pawl means carried on said frame and adapted to be engaged by said ratchet wheel means when said tensioning wheel is rotated in a direction opposite to the tensioning direction; and

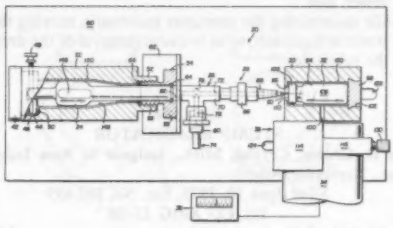
strap cutter means on said frame, linked to said pawl means, and driven by said ratchet wheel means to sever said strap.

4,041,994

DOSE DISPENSER FOR RADIOACTIVE GAS

Norman H. Horwitz, 6608 Cottonwood Knoll, West Bloomfield Hills, Mich. 48033, and Robert F. Gutkowski, 36824 Manning Court, Sterling Heights, Mich. 48077

Filed Sept. 22, 1975, Ser. No. 615,737
Int. Cl.² B65B *3/04*
U.S. Cl. 141—1 **13 Claims**



11. A method of dispensing unit doses of radioactive gas from a multi-Curie shipping ampul to a serum vial, the metering apparatus including a shielded ampul housing having a chamber, a metering valve and a shielded vial housing having a chamber in communication with said ampul chamber through said metering valve, said vial housing having an aperture, an ionizing radiation detector supported adjacent said vial housing aperture and a meter electrically connected to said detector, said apparatus pivotally mounted on a support, comprising the steps of:

tilting the apparatus with the ampul housing opening upwardly at an angle;

inserting a weighted seal breaker in the ampul housing chamber;

inserting a multi-Curie shipping ampul having a center flame seal in the ampul housing and sealing the housing;

tipping the apparatus sharply with said ampul housing opening extending downwardly to break said flame seal of the shipping ampul;

opening said metering valve to permit the flow of radioactive gas into said serum vial; and

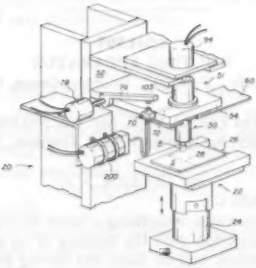
monitoring the activity of the radioactive gas in said serum valve with said radiation detector and meter.

4,041,995

GAS PRESSURE-ACTIVATED DROP DISPENSER

Richard L. Columbus, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 545,670, Jan. 30, 1975, abandoned. This application Dec. 24, 1975, Ser. No. 644,014
Int. Cl.² B01L *11/00*; B65D *83/14*
U.S. Cl. 141—275 **32 Claims**



26. A process for the precise dispensing onto a substrate of a

drop of a fluid having a surface tension which varies from between about 35 dynes/cm and about 75 dynes/cm, the process comprising the steps of

depositing the fluid in an open-top container having a dispensing aperture the maximum dimension of which is less than that which will permit gravity flow of the fluid;

pressurizing the air in the top of said container and thus the fluid in an amount sufficient to form a pendant drop outside the container at the aperture while maintaining the fluid free of contact with apparatus other than the container, and

while maintaining the container stationary, moving the substrate into contact, so as to cause removal of the drop onto the substrate.

4,041,996

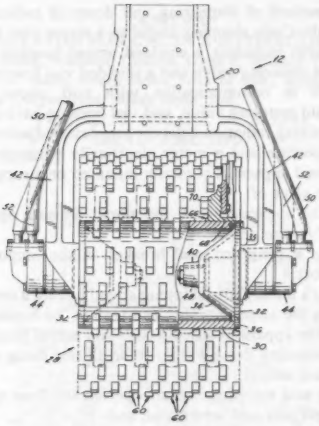
STUMP ERADICATOR

Ross D. Grover, Crystal, Mich., assignor to Ram Industries, Inc., Northville, Mich.

Filed June 10, 1975, Ser. No. 585,459

Int. Cl.[2] A01G *23/08*

U.S. Cl. 144—2 N **4 Claims**



1. Apparatus for eradicating tree stumps and the like, comprising a frame adapted to be mounted on a vehicle, a yoke on said frame having spaced arms, a cylindrical drum disposed between said arms and having cutting elements on the periphery thereof, a motor carried by one of said arms, said motor having an output shaft in axial alignment with the axis of rotation of said drum and directly connected to one end of said drum on its axis of rotation, said motor and its output shaft serving to mount said one end of said drum on said one arm of said yoke and also serving as a means to rotate said drum, and means rotatably mounting the other end of said drum on the other arm of said yoke.

4,041,997

ROUTING APPARATUS

Barry David Selfe, "Fourays", Seamans Green, Capel, Surrey, England

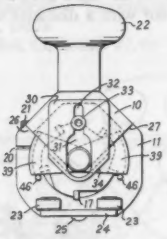
Filed Feb. 14, 1975, Ser. No. 550,050

Claims priority, application United Kingdom, Feb. 14, 1974, 6861/74

Int. Cl.[2] B27C *5/10*

U.S. Cl. 144—136 C **10 Claims**

1. Routing apparatus comprising a frame having an inner end shaped for connection with the housing of an electric motor having drive means, and an outer end having an integral arm thereon; a shaft having a routing cutter thereon and having one end located in said integral arm and the other end shaped so as to be coupled with said drive means; said arm having side faces that lie in respective planes which extend parallel to the axis of rotation of the shaft and have an included angle of up to and including 90°, and said arm further having at the free outer end thereof an arcuate end face with said planes extending tangentially thereto, the end face acting to define the maximum cutting depth; a boss on the outer face of the arm with a portion of the surface thereof coplanar with said arcuate end face; and at least part of the frame adjacent the arm being confined between the respective planes.



4,041,998

END-JOINTING OF TIMBER

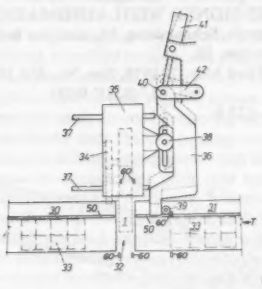
George Moorley, Leicester, England, assignor to Wadkin Limited of Green Lane Works, England

Filed Mar. 15, 1976, Ser. No. 667,213

Claims priority, application United Kingdom, Mar. 22, 1975, 12071/75

Int. Cl.[2] B27G *11/00*; B27F *1/08*

U.S. Cl. 144—315 R **8 Claims**



1. A method of joining pieces of timber end-to-end to form a continuous length, which comprises the following consecutive steps:

positioning two pieces of timber in end-to-end relationship;

moving a rotating cutter disc from a rest position transversely across the timber so that peripheral saw teeth on the cutter disc square the facing ends of the pieces of timber;

effecting relative movement between each piece of timber and the rotating cutter disc so as to bring the facing ends of the pieces of timber into contact with cutter teeth on opposite side faces of the cutter disc to cut arcuate grooves in the timber, adjacent grooves on each piece of timber being separated by arcuate fingers and the fingers on one piece of timber being aligned with the grooves on the other piece;

effecting relative movement between each piece of timber and the rotating cutter disc so as to remove the timber from the path of the cutter teeth;

removing the cutter disc transversely back to said rest position;

applying adhesive to the facing grooved ends of the timber and

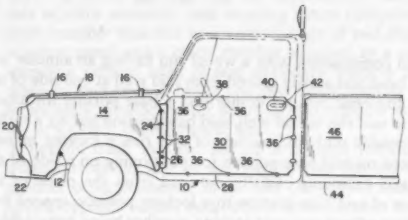
pushing the facing grooved ends of timber together so that the fingers of each piece are received in the grooves of the other piece.

4,041,999

VEHICLE PROTECTOR

Richard E. Miller, 370 "K" St., Apt. No. 66, Chula Vista, Calif. 92010

Filed Nov. 2, 1976, Ser. No. 738,384
Int. Cl.² B60J *11/00*
U.S. Cl. 150—52 K **6 Claims**



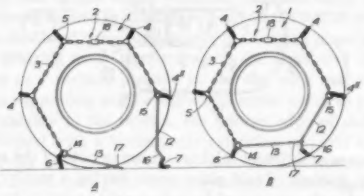
1. A vehicle protector comprising a plurality of flexible sheets, one surface of the sheets having a soft resilient-like covering, the other surface of each of the sheets being formed from a flexible plastic waterproof material, a first pair of sheets having marginal edges substantially conforming to the marginal edges of the front fenders of a vehicle, a first elastic flexible band fixedly secured at the ends thereof to each of the sheets of said first pair of sheets, said first flexible band being disposed on the outermost surface of the hood of said vehicle when said first pair of sheets are disposed covering said front fender, a second elastic flexible band being disposed joining each of said first pair of sheets, said second flexible band being disposed covering the grille portion of said vehicle when said first pair of sheets are disposed covering said front fenders, a first plurality of snap fasteners being disposed in spaced apart relationship along one marginal edge of each of said first pair of sheets, said first plurality of snap fasteners being disposed removably secured to first complementary snap fasteners being disposed fixedly secured in spaced apart relationship to the exterior surface of said vehicle along first lines located adjacent to the leading marginal edge of the frontmost doors of said vehicle, a second pair of sheets having marginal edges substantially conforming to the marginal edges to the door panels of said frontmost doors of said vehicle, a second plurality of snap fasteners disposed in spaced apart relationship along one marginal edge of each of said second pair of sheets, a first plurality of hook-like members fixedly secured to and extending outwardly from the other marginal edges of said second pair of sheets, said second plurality of snap fasteners being disposed removably secured to a second plurality of complementary snap fasteners, said second plurality of complementary snap fasteners being disposed fixedly secured in spaced apart relationship along second lines, said second lines being disposed parallel to said first lines, said first plurality of hook-like members being disposed capturing a portion of said marginal edges of said door panels, a third pair of sheets having marginal edges substantially conforming to the substantially vertical remaining side panels of said vehicle, a third elastic flexible band being disposed joining each of said third pair of sheets, a second plurality of hook-like members being disposed fixedly secured to the marginal edges of each of said third pair of sheets, said second plurality of hook-like members being disposed capturing a portion of the marginal edges of said remaining side panels of said vehicle when said third pair of sheets are disposed covering said remaining side panels of said vehicle, said third flexible band being disposed at the rear end of said vehicle when said third pair of sheets are disposed covering said remaining side panels of said vehicle.

4,042,000

DEVICE FOR TIRE CHAINS

Kåre Jørgen Nylund, Makevelen 2, 4500 Mandal, Norway

Filed May 6, 1976, Ser. No. 683,703
Int. Cl.² B60C *27/06*
U.S. Cl. 152—213 A **3 Claims**



1. A tire chain permitting quick and easy attachment to the wheel of a car, comprising:

two side chains, a first chain for placement on the outer side of the wheel and a second side chain for placement on the inner side of the wheel, each of said side chains being made of a plurality of side chain segments;

gripping elements connected between said side chains;

connecting means for connecting the ends of said first side chain when in place around the tire;

a first bar forming the last said side chain segment of said second side chain, said first bar having a first eye on one end thereof and a second eye on the other end thereof; said first eye connecting said first bar to the rest of said second side chain, and said second eye forming the end of said second side chain, said second eye also connecting the endmost of said gripping elements, said second eye being turned 90° in relation to said first eye and being disposed at an angle with respect to the longitudinal axis of said first bar;

a second bar connected to the other end of said second side chain, said second bar having an eye connecting said second bar to the end of said second side chain opposite said first bar; and

a U-shaped hook at the end of said second bar, said U-shaped hook being turned 90° in relation to the eye of said second bar;

whereby the tire chain is attached to the wheel by placing the tire chain across the wheel with said first side chain on the outer side of the wheel, said U-shaped hook on said second bar is hooked around said first bar so that said second bar rests in a locking position against said second eye, said second eye lying outside said U-shaped hook of said second bar, so that said second side chain is locked together on the back of the wheel, and said first side chain is connected together on the outer side of the wheel by means of said connecting means.

4,042,001

WEAR-RESISTANT LINK FOR TIRE CHAINS

Anton Müller, Aalen-Unterkochen, Germany, assignor to Eisen -und Drahtwerk Erlau Aktiengesellschaft, Aalen, Germany

Filed Dec. 15, 1975, Ser. No. 641,071
Claims priority, application Germany, Dec. 14, 1974, 2459280
Int. Cl.² B60C *27/06*
U.S. Cl. 152—243 **6 Claims**

1. A connection member for chains, especially for protective tire chains, with a link body consisting of two arms parallel to each other and interconnected by a transverse piece extending substantially at right angles therebetween such that an essentially U-formed structural part is formed thereby defining an

inlet and receiving opening lying between the arms, and having a bearing piece formed by a bolt limiting the receiving opening for a chain member suspended in the receiving opening and arranged at least partially at right angles to the arms of the link body, the improvement therewith which comprises

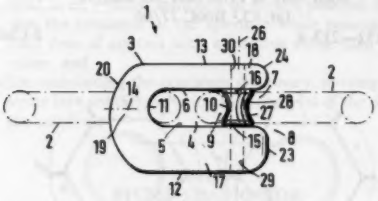


plate means of different thickness forming both of the arms, at least the thickest of said plate means having a smaller width measured in the vicinity of the bolt at right angles to the axis of the bolt than the width in an adjoining region of the receiving opening.

4,042,002

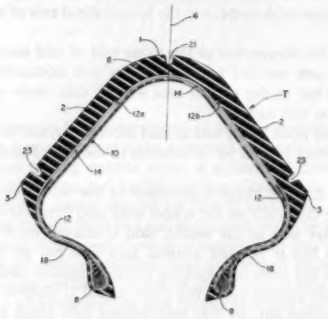
MOTORCYCLE TIRE

Clarence B. Alsobrook, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 31, 1976, Ser. No. 672,361

Int. Cl.² B60C *9/04, 9/22*

U.S. Cl. 152—354 **2 Claims**



1. A motorcycle tire comprising a tread terminating in axially spaced circumferential shoulders, a pair of beads, and sidewalls having improved uniformity of flexure, said tire having a carcass consisting of a single bias carcass ply of cord angles of 20° to 38° (in the cured state) extending between the beads, and a single bias breaker ply of bias cord angles equal and opposite to the bias cord angles of the carcass ply disposed symmetrically and circumferentially about the carcass ply and terminating between the shoulders, said carcass ply being lapped under the beads and turned outward to extend through and beyond the sidewalls to overlie 50 to 90 percent of the breaker ply and between the breaker ply and the tread, whereby said motorcycle tire is provided with sidewalls free of discontinuity and the carcass ply turned about the beads terminates beneath the tread and radially outwardly of the shoulders thereof.

4,042,003

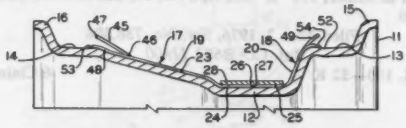
TIRE BEAD RETAINER

Gerald E. Gaskill, Farmington Hills, Mich., and James E. Woodlee, Kent, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Sept. 10, 1975, Ser. No. 611,929

Int. Cl.² B60C *15/02*

U.S. Cl. 152—381.2 **15 Claims**



1. In combination with a wheel rim having an annular well and a bead seat axially spaced from said well at one side of said rim a tire bead retainer comprising a base portion for attachment to said rim in said well, said base portion having a surface conformable with said surface of said rim, a locking member mounted on said base portion for positioning on a side of said well and extending radially outward from the plane of said surface of said base portion to a locking position spaced from a surface of said rim, said locking member being retractable to a retracted position close to said surface and resilient means urging said locking member into locking position whereby a tire bead may be moved into said well and toward said side of said well over said base portion, said locking member being movable into the retracted condition by said bead during mounting of said tire and resiliently returned to said locking position after said bead has been moved onto said bead seat.

4,042,004

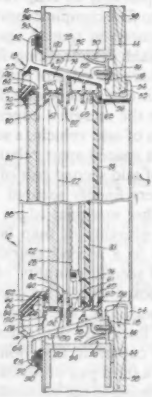
WINDOW ASSEMBLY

Gerald A. Kwan, Pasadena, Calif., assignor to Hehr International Inc., Los Angeles, Calif.

Continuation of Ser. No. 558,798, March 17, 1975, abandoned. This application Oct. 22, 1976, Ser. No. 734,992

Int. Cl.² E06B *3/32*

U.S. Cl. 160—91 **4 Claims**



1. An improved window assembly adapted for installation in an aperture of a recreational vehicle wall structure and comprising:

a. a metal frame having a base and a plurality of approximately parallel inwardly extending flanges integral with and transverse to said base and surrounding said frame to form a plurality of channels therein of which the base provides a common floor, said frame also having an out-

wardly facing circumferential flange for surrounding said aperture and for lapping the outer surface of said wall structure adjacent said aperture, said floor being sloped with respect to a plane perpendicular to said wall structure, at least one of said channels having opposed ledges elevated above the floor of said channel and being adapted to support a flexible track member elevated above said floor, at least the two outermost flanges being slotted along a common axis adjacent said base to provide aligned drainage apertures through which any water in said one of said channels drains along said sloped floor to the exterior of said wall structure;

b. a stationary removable glass panel positioned in the outermost one of said channels, a slidable removable glass panel positioned in an inner one of said channels for sliding therein;

c. securing means positioned at the approximate center of said window assembly, said securing means comprising a latch member attached to a vertical edge of said slidable window panel and a catch member attached to a corresponding vertical edge of said stationary window panel whereby said latch member and said catch member may be securely interlocked for securing said window assembly in a closed configuration; and

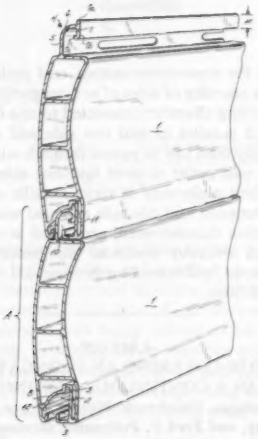
d. a flexible track member having a channel therein for slidably receiving one of said panels, said flexible track member being positioned in the said one of said channels having opposed ledges, said flexible track member having two separate legs, each such leg being positioned on a channel ledge whereby said track member is elevated above said channel floor to permit unobstructed drainage along the floor and through said aligned drainage apertures.

4,042,005

ROLLING SHUTTERS

Gerd Hammerstein, Haan, Germany, assignor to Carl Schnicks & Co., Haan, Germany

Filed Mar. 9, 1976, Ser. No. 665,262
Int. Cl.[2] E06B *3/14, 3/20*
U.S. Cl. 160—220 **1 Claim**



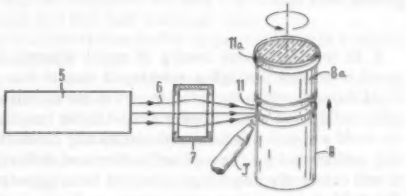
1. A rolling shutter comprising a plurality of vertically superposed slats of hollow-profile construction and composed of synthetic-resin material, said slats being formed along their respective upper and lower edges with mating formations defining lockable articulations between laterally contiguous slats, one of said formations being formed as a channel and the other formation being formed as a tongue, said tongue having a web projecting vertically in a vertical position of said slat, an arcuate portion on said web and a substantially vertical flange on said arcuate portion, said channels each being formed with a planar vertical partition within the respective slat in a vertical position thereof, rising from a limiting flange defining the mouth of said channel and parallel to but spaced from an outer wall of said slat, a diagonal partition extending from the top of said vertical partition to another outer wall of said slat opposite the first-mentioned outer wall and formed with an arcuate supporting surface conforming to and adapted to bear against said arcuate portion of a tongue of an adjoining slat, and a flange-receiving groove at the junction of said partitions opening towards said limiting flange and adapted to receive the flange of said tongue of said adjoining slat, said flange of said tongue being formed as a T-shaped head on the end of said bent portion, said head lying substantially in a vertical plane parallel to and abutting over its entire width the respective vertical partition in a vertical position of the slat with said vertical partition supporting said head over its entire width to provide lateral stability to the shutter, the bottom edge of said head being formed with a horizontally extending rib, said limiting flange being formed adjacent the mouth of said channel with an inwardly extending rib, said diagonal partition being formed in part by a connecting profile member joining a wall of said slat with said arcuate surface, said horizontally extending rib having a width which is less than the distance between said inwardly extending rib and said vertical partition, said groove having a depth and a bottom spaced from said limiting flange by by a distance W such that $(W - b) > w$, where w is the width of said T-shaped head.

4,042,006

PYROLYTIC PROCESS FOR PRODUCING A BAND-SHAPED METAL LAYER ON A SUBSTRATE

Alfred Engl, and Guenther Heim, both of Regensburg, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Continuation-in-part of Ser. No. 429,100, Dec. 28, 1973, abandoned. This application Oct. 22, 1975, Ser. No. 624,711
Claims priority, application Germany, Jan. 5, 1973, 2300481
Int. Cl.[2] B22D *23/00;* B05D *3/02, 3/06*
U.S. Cl. 164—46 **1 Claim**



1. A pyrolytic method for the production on a cylindrical carrier member of resistors having a band-shaped resistance layer and a contact area at the ends thereof, comprising:

surrounding a surface of the carrier member to be coated with a first fluid mixture of at least one thermally decomposable metal compound and a carrier therefor;

substantially simultaneously heating only precise surface areas of said carrier member by a laser beam or an electron beam to a temperature slightly above the decomposition temperature of said metal compound, rotating said carrier member about a vertical axis thereof and axially moving said carrier member along the vertical axis thereof whereby a band-shaped helical metal deposit forms only on said precise surface areas of the carrier member;

removing said first fluid mixture from about the carrier member and stopping said axial movement of the carrier member while maintaining the rotational movement thereof;

surrounding the surface of such carrier member with a sec-

ond fluid mixture of at least one thermally decomposable metal compound and a carrier therefor;

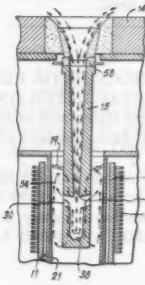
heating only precise surface areas of the carrier member by a laser beam or an electron beam to a temperature substantially above the decomposition temperature of the metal compound in the second fluid mixture whereby a band-shaped cylindrical metal deposit forms only on said precise surface areas of the carrier member so as to define spaced metal contact areas on said helical metal deposit; and

relatively quickly cooling the resultant carrier member with metal deposits thereon so as to form discontinuities in the carrier member for separating the helical metal deposits with the spaced contact areas thereon into individual resistors having contacts at opposite ends thereof.

4,042,007
CONTINUOUS CASTING OF METAL USING ELECTROMAGNETIC STIRRING

Alexander A. Zavaras, Athens, Greece; Robert Sobolewski, Streetsboro, and Cecil B. Griffith, North Royalton, both of Ohio, assignors to Republic Steel Corporation, Cleveland, Ohio

Filed Apr. 22, 1975, Ser. No. 571,016
Int. Cl.[2] B22D *27/02, 11/10*
U.S. Cl. 164—49 10 Claims



1. In the continuous casting of metal wherein the liquid metal is poured through a submerged shroud into a cooled mold through which the metal moves in one direction with an outer solidifying shell defining a solid-liquid interface within the mold and which is lined with electrically conductive material, said shroud having a closed bottom and delivering metal to exit outwardly into a region located in an upper portion of the mold, the procedure comprising:

a. pouring the metal through a slag layer in contact with the metal substantially upstream of said region; and

electromagnetically circulating the metal in the mold by producing an alternating current field adjacent to the mold between approximately the slag-metal interface and a locality situated downstream of said outward exit, said alternating current being supplied to have at least two successively different phases in longitudinally successive regions to thereby provide circulation of the liquid metal in a direction generally opposite to said one direction along said solid-liquid interface from said locality to the slag layer and generally in said one direction along the outer surface of the shroud, said current being supplied at a frequency sufficiently high to move the metal in the described circulation and sufficiently low that effective metal-moving power is transmitted despite attenuation by said conductive lining such that the electromagnetically induced metal flow acts to positively sweep nonmetallic inclusions intrained in the outflow from the shroud along said solid-liquid interface in spaced relation thereto along the slag layer whereby removal of inclusions into the slag is promoted;

wherein the improvement comprises

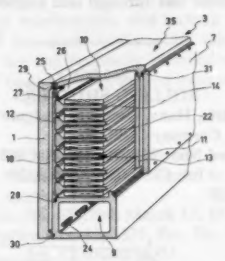
c. the pouring step comprising pouring the liquid metal through a shroud having a central bore tapering continuously throughout the entire length of the shroud in a downstream direction to constitute a nozzle, and into a well defined by the closed bottom of the shroud downstream of and opening toward the nozzle, for outward exit of metal to the mold through ports opening laterally through the shroud between the well and the nozzle and oriented at an obtuse angle to said one direction, while maintaining a metal level in the mold at least several inches above said ports; and

d. injecting an inert gas into the liquid metal being poured through the shroud, at a locality upstream of said region, for dispersing the gas through the liquid metal in the form of fine bubbles prior to exit of the metal into the mold.

4,042,008
CONTINUOUS-CASTING MOLD WITH ELECTROMAGNET

Robert Alberny, and Louis Vedda, both of Metz, France, assignors to Institut de Recherches de la Siderurgie Francaise, Saint-Germain-en-Laye, France

Filed Sept. 14, 1976, Ser. No. 723,194
Claims priority, application France, Sept. 17, 1975, 75.28439
Int. Cl.[2] B22D *11/02, 27/02*
U.S. Cl. 164—147 10 Claims



1. A mold for continuous casting, said mold comprising: a tube having a plurality of sides of non-magnetic material; a box defining a cooling chamber connected to one of said sides and having a wall parallel to said one side and an inlet and an outlet, whereby fluid can be passed through said chamber from said inlet to said outlet to cool said one side and said wall; means including a plurality of rigid metallic elements in said box braced between said one side and said wall for forming a rigid connection therebetween; and a coil wound on each of said elements, whereby electrical energization of said coils forms a magnetic field extending through said one side and said wall into said tube.

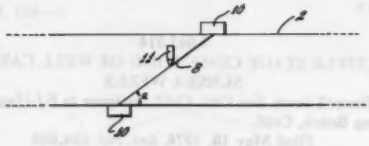
4,042,009
STRIP FOR COVERING AN ELONGATED MOLD CAVITY IN A CONTINUOUS CASTING MACHINE

Wilhelm Horstman, Osnabruck; Werner Meyer, Hannover, both of Germany, and Fred F. Polizzano, deceased, late of Allendale, N.J. (by Anita Polizzano, executrix), assignors to Kabel- und Metallwerke Gutehoffnungshutte Aktiengesellschaft, Hannover, Germany

Filed Aug. 7, 1975, Ser. No. 602,763
Claims priority, application Germany, Aug. 31, 1974, 2441795
Int. Cl.[2] B22D *11/06*
U.S. Cl. 164—278 10 Claims

1. In a casting machine having a rotating drum with a mold cavity defining groove or the like looping around its periphery, and having means pouring molten material into the groove an

endless covering part of the groove along said periphery, (i) for completing the cavity from which an elongated casting is withdrawn and (ii) being cooled from the side opposite the covered groove for cooling the molten material when in the cavity, and (iii) moving in a closed loop part of which moving without covering any part of the grooves, comprising:



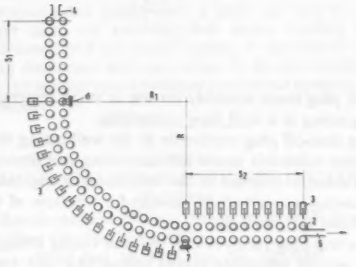
the strip being made of a heat resisting, age hardened copper alloy with a dominating copper content, and having oblique ends joined by fusion welding to obtain an endless belt with a fusion welded joint which extends at an angle of from about 30° to about 45° to a direction of movement and of longitudinal extension of the belt, the belt moving with the drum for covering said part on a progressive basis.

4,042,010

APPARATUS FOR WITHDRAWAL OF CONTINUOUSLY CAST INGOTS

Gerhard Komma, Dinslaken-Hiesfeld, and Hans Schrewe, Duisburg, both of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Germany

Filed Dec. 22, 1975, Ser. No. 643,147
Claims priority, application Germany, Dec. 20, 1974, 2461045
Int. Cl.² B22D *11/12*
U.S. Cl. 164—282 **4 Claims**



1. In a continuous casting machine having a mold and a roller track for withdrawing and guiding an ingot from a vertical or substantially vertical direction of immediate withdrawal, to a horizontal direction of withdrawal, the roller track and withdrawal path being curved in between an arrangement of rolls, providing for at least one point or a first point of bending the ingot into the curved path and there being at least one point or a first point of straightening the ingot from the curved path into a straight horizontal path, the improvement comprising:

a first plurality of the rolls being disposed on an outside path of the track and extending from said one or first bending point to said one or the first straightening point, there being means for resiliently-yielding mounting the rolls of the first plurality of rolls with at least a component of movement in radial direction with regard to curving of the path and track;

a second plurality of the rolls being disposed in continuation of an inside path of the track in and beyond said one or first point of straightening in the direction of withdrawing, there being means for resiliently-yieldingly mounting the rolls of the second plurality of rolls with at least a component of movement in vertical direction;

a third plurality of rolls being disposed on an inside path of the track and extending from said one or first bending point to said one or the first straightening point, there being means for rigidly mounting the rolls of the third plurality of rolls; and

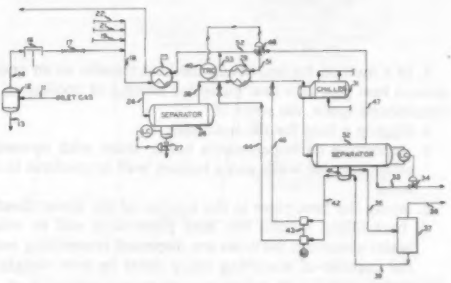
a fourth plurality of rolls being disposed on an outside path of the track in and beyond said one or first point of straightening in the direction of withdrawing, there being means for rigidly mounting the rolls of the fourth plurality of rolls.

4,042,011

REFRIGERATION CONTROL

Julius E. Schneider, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 22, 1975, Ser. No. 642,882
Int. Cl.² B01D *3/42, 5/00;* F25J *3/00*
U.S. Cl. 165—1 **12 Claims**



1. A process for cooling a first fluid stream with a second fluid stream which comprises:

cooling said first stream by passage through a first heat exchange zone;

measuring the temperature of said first stream after passing through said first heat exchange zone;

cooling said first stream further by passage through a second heat exchange zone;

heating a first part of said second fluid stream by passing through said second heat exchange zone while passing a second part of said second fluid stream through a bypass zone around said second heat exchange zone;

heating said second part of said second fluid stream by passage through said first heat exchange zone; and

controlling the flow of said first and second part of said second fluid stream in response to the measured temperature of said first stream.

11. Apparatus for cooling a first fluid stream with a second fluid stream which comprises:

a first heat exchanger;

means for passing a first fluid stream through said first heat exchanger;

means to measure the temperature of said first stream after passing through said first heat exchanger;

a second heat exchanger;

means to pass said first stream through said second heat exchanger for further cooling;

means to pass a first part of a second fluid stream through said second heat exchanger in heat exchange relation with said first fluid stream;

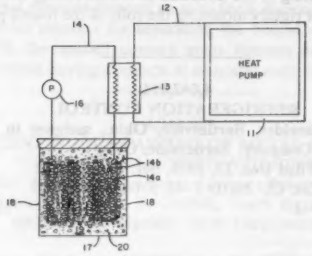
means to pass a second part of said second fluid stream through a bypass around said second heat exchanger and then through said first heat exchanger in heat exchange relation with said first stream; and

means to control the flow of said first and second parts of said second fluid stream in response to the measured temperature of said first fluid stream.

4,042,012
HEAT PUMP SYSTEM WITH IMPROVED HEAT TRANSFER

Elijah R. Perry, Portola Valley, and Mario Rabinowitz, Menlo Park, both of Calif., assignors to Electric Power Research Institute, Palo Alto, Calif.

Filed Aug. 27, 1976, Ser. No. 718,348
Int. Cl.² F25B *27/02*; F28F *9/22*
U.S. Cl. 165—1 **20 Claims**



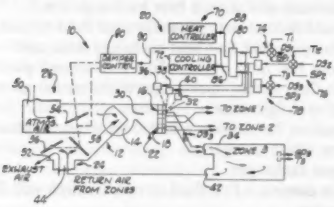
1. In a method for increasing the heat transfer to an underground heat pipe of a heat pump for heating or cooling an air conditioned space, the steps of

a. digging a hole for the heat pipe,
b. depositing an impermeable lower sheet with upwardly extending side walls and a bottom wall to conform to the hole,
c. laying the heat pipes in the interior of the lower sheet,
d. back-filling around the heat pipes with soil in which water-absorbent particles are dispersed comprising material capable of absorbing many times its own weight of water, and
e. soaking said absorbent particles with water.

4,042,013
METHOD AND APPARATUS FOR CONTROLLING AIR-CONDITIONING SYSTEMS

Merlin E. Demaray, and Russell G. Attridge, Jr., both of Columbus, Ohio, assignors to Ranco Incorporated, Columbus, Ohio

Filed Feb. 26, 1976, Ser. No. 661,619
Int. Cl.² F25B *13/00*
U.S. Cl. 165—2 **7 Claims**



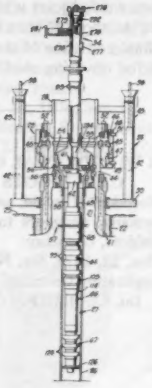
1. A method of controlling the temperature in an air conditioned zone by heating or cooling a temperature controlling medium flowing to the zone and by controlling the flow of the medium to the zone comprising:

a. sensing zone temperature conditions;
b. producing command signals which vary according to sensed zone temperature condition changes occurring outside of a no load band of zone temperatures;
c. heating the medium when said command signal values are in a first predetermined range of values produced by sensing zone temperatures below the no load band;
d. cooling the medium when said command signal values are in a second predetermined range of values produced by sensing zone temperatures above the no load band;
e. altering the flow of medium to the zone in response to changing command signal values between said first and second ranges of values; and
f. maintaining a substantially constant command signal value in response to sensed zone temperature conditions ranging within said no load band.

4,042,014
MULTIPLE STAGE CEMENTING OF WELL CASING IN SUBSEA WELLS

Lyle Burnell Scott, Sun City, Calif., assignor to BJ-Hughes Inc., Long Beach, Calif.

Filed May 10, 1976, Ser. No. 684,808
Int. Cl.² E21B *7/12*
U.S. Cl. 166—.5 **28 Claims**



1. A plug stack assembly for use in stage cementing a well casing string in a well bore comprising:

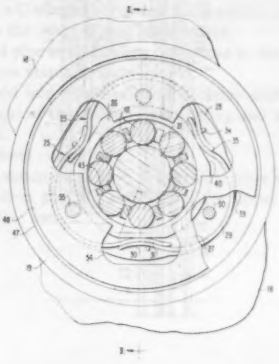
A. a shut-off plug receivable in the well casing string;
B. first releasable means for connecting said shut-off plug to a mandrel inserted in the well casing string, said mandrel having a longitudinal passage for the flow of cementing fluids therethrough;
C. a trip-plug receivable in the well casing string;
D. second releasable means connecting said trip-plug directly to said shut-off plug;
E. a first-stage cementing plug receivable in the well casing string;
F. third releasable means connecting said first-stage cementing plug directly to said trip-plug;
G. means defining a passage through each plug for the flow of cementing fluids from the longitudinal passage of the mandrel into the well casing string;
H. said first-stage cementing plug having means cooperative with a first closure member in said cementing fluid to close the passage in said first-stage cementing plug and effect release of said thid releasable means responsive to cementing fluid pressure;
I. said trip-plug having means cooperative with a second closure member in said cementing fluid to close the passage in said trip-plug and effect release of said second releasable means responsive to cementing fluid pressure; and
J. said shut-off plug having means cooperative with a third closure member in said cementing fluid to close the passage in said shut-off plug and effect release of said first releasable means responsive to cementing fluid pressure.

4,042,015

CENTRAL MOUNTING OF THE HEAT-EXCHANGE PLATE OF A REGENERATIVE HEAT-EXCHANGER

Klaus Wiegard, Esslingen-Zollberg, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

Filed Oct. 18, 1976, Ser. No. 733,051
Claims priority, application Germany, Oct. 22, 1975, 2547175
Int. Cl.[2] F28D *19/00*
U.S. Cl. 165—8 7 Claims



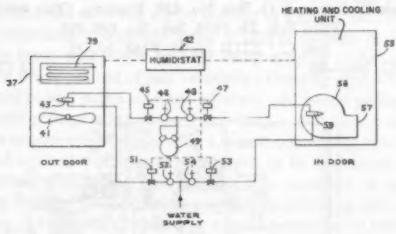
1. A heat-exchanger disk of a regenerative heat-exchanger of a gas turbine, which is secured on a rotatable carrier means under interposition of ring-shaped leaf spring elements which are connected with each other near their ends and which are supported under prestress by way of outwardly curved arcuate portions at counter-surfaces in a central opening of the heat-exchanger disk and by way of inwardly curved arcuate portions at countersurfaces of the carrier means, characterized in that a retaining disk means abuts at each end face of the heat-exchanger disk, said retaining disk means holding the leaf spring elements and the carrier means, in the central opening and being connected with each other by tie pins which extend through the annular space between the central opening and the carrier means.

4,042,016

ENVIRONMENTAL HUMIDIFICATION AND COOLING SYSTEM

Evelyn Boochever, and Michael Munk, both of 28 Dorchester Drive, Port Chester, N.Y. 10573

Filed Oct. 28, 1975, Ser. No. 625,923
Int. Cl.[2] F24F *3/14*
U.S. Cl. 165—20 8 Claims



1. In a closed environment air conditioning system receptive of air to be conditioned:

a heating/cooling unit including a chamber receptive of recirculating air before the air enters the heating/cooling unit:

means for simultaneously evaporatively cooling and humidifying the air to the conditioned comprising actuatable ultrasonic spray means including an ultrasonic spray nozzle positioned to spray into the recirculating air in the chamber and receptive of a supply of water during use for atomizing the water and spraying same into the air to be conditioned and controllable compressor means for supplying pressurized air to the ultrasonic spray nozzle; and

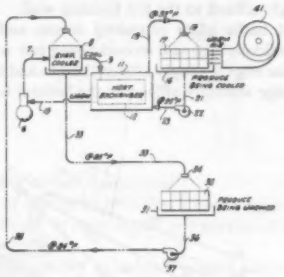
means for actuating and deactuating the ultrasonic spray means to control the level of humidification in the conditioned air.

4,042,017

PRODUCE WARMER

Robert H. Dench, Monte Sereno, and Victor J. Dervin, Cupertino, both of Calif., assignors to Mobile Product Services, Inc., Burlingame, Calif.

Filed Oct. 29, 1975, Ser. No. 626,663
Int. Cl.[2] F25B *29/00*
U.S. Cl. 165—63 4 Claims



1. A produce warmer comprising an evaporative cooler, a heat exchanger, a primary refrigerant circuit including said evaporative cooler and said heat exchanger in series, means in said primary refrigerant circuit for circulating refrigerant therein in a direction through said evaporative cooler wherein said refrigerant is cooled and then through said heat exchanger wherein said refrigerant is warmed and then back to said evaporative cooler, a first housing for produce to be cooled, a secondary water circuit including said first housing and said heat exchanger in series, means in said secondary water circuit for circulating water therein in a direction through said heat exchanger wherein said water is cooled and then through said first housing wherein said water is warmed by heat transfer from produce therein and then back to said heat exchanger, a second housing for produce to be warmed, a tertiary water circuit including said second housing and said evaporative cooler in series, and means in said tertiary water circuit for circulating water therein in a direction through said evaporative cooler wherein said water is warmed and then through said second housing wherein said water is cooled by heat transfer to produce therein and then back to said evaporative cooler.

4,042,018

PACKAGING FOR HEAT EXCHANGERS

William Henry Zebuhr, Nashua, N.H., assignor to Des Champs Laboratories Incorporated, East Hanover, N.J.

Filed Sept. 29, 1975, Ser. No. 617,733
Int. Cl.[2] F28F *3/12*
U.S. Cl. 165—166 6 Claims

1. A heat exchanger assembly for transmitting thermal energy from one moving body of fluid to another comprising

a folded sheet of heat conductive material, the individual folds of said sheet defining adjacent fluid flow passages, alternate ones of said passages defining a first conduit means for conducting relatively warm fluids, the other

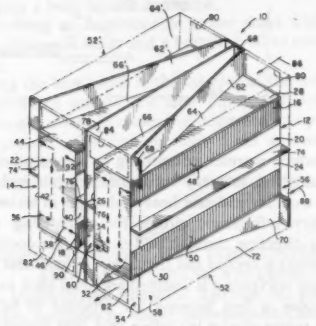
passages defining a second conduit means for conducting relatively cool fluids;

a casing containing said folded sheet having a substantially rectangular cross section having a pair of opposed side walls and first and second end walls, entrance and exit openings for said first conduit means being formed in one of said opposed sides adjacent the first and second end walls respectively and entrance and exit openings for said second conduit means being formed in the other of said opposed sides adjacent the second and first end walls respectively;

a housing enclosing said casing, said housing having a top and bottom walls substantially parallel to and spaced from said first and second end walls respectively, front and rear walls, and a pair of side walls, each being substantially parallel to and spaced from a respective one of said pair of opposed casing side walls;

a first baffle plate extending across and substantially perpendicularly to said first casing end wall having one elongate edge sealingly affixed thereto and the other elongate edge sealingly affixed to the top housing wall;

a second baffle plate extending across and substantially perpendicularly to said second casing end wall having one elongate edge sealingly affixed thereto and the other elongate edge sealingly affixed to the bottom housing wall;



a third baffle plate extending across one of said pair of opposed casing side walls having one elongate edge sealingly affixed thereto and the other elongate edge sealingly affixed to the corresponding housing side wall;

a fourth baffle plate extending across the other of said pair of opposed casing side walls having one elongate edge sealingly affixed thereto and the other elongate edge sealingly affixed to the corresponding housing side wall;

said first and third baffle plates defining a first plenum chamber fluidly communicating with the first conduit means entrance opening, said first and fourth baffle plates defining a second plenum chamber fluidly communicating with the second conduit means exit opening, said second and third baffle plates defining a third plenum chamber fluidly communicating with said first conduit means exit opening and said second and fourth baffle plates defining a fourth plenum chamber fluidly communicating with said second conduit means entrance opening;

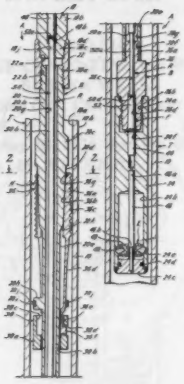
whereby fluid at a first temperature is directed into one of said first or third plenum chambers, into said first conduit means and then into the other of said first or third plenum chambers while fluid at a second temperature is directed into one of said second or fourth plenum chambers, into said second conduit means wherein thermal exchange occurs between said fluids, and then into the other of said second or fourth plenum chambers.

4,042,019

WIRELINE ACTUATED TUBING CUTTER

Jack A. Henning, P.O. Box 158, Refugio, Tex. 78377

Filed Mar. 15, 1976, Ser. No. 666,904
Int. Cl.[2] E21B *29/00*
U.S. Cl. 166—55 **6 Claims**



1. An apparatus adapted to be run into a well on a wireline for explosively cutting tubing, comprising:

explosive cutting means for explosively cutting tubing in a well;

a body member having an upper end and a lower end, said upper end of said body member being connected to the wireline and said lower end of said body member having said explosive cutting means mounted therewith;

settable hanging means movably mounted with said body member above said explosive cutting means for securing said body member with the bore of the tubing prior to detonation of said explosive cutting means, said settable hanging means being set by a downward setting force and released by an upward setting force; and,

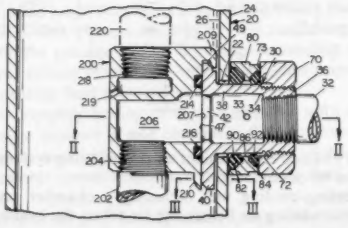
firing means for mechanically firing said explosive cutting means, said firing means mounted with said body member and actuated by the wireline transmitting a downward mechanical detonating force to said firing means to explosively activate said explosive cutting means for severing the tubing in the well.

4,042,020

POSITIVE SEAL PITLESS WELL ADAPTER

William Wellstein, P.O. Box No. 430, Fostoria, Ohio 44830

Filed Feb. 23, 1976, Ser. No. 660,396
Int. Cl.[2] E21B *33/03;* F16L *55/00*
U.S. Cl. 166—85 **22 Claims**



1. In a side pipe well casing adapter comprising:

A. a well casing having a radial hole in its side,
B. a hanger member having a nipple portion extending through said hole and having a flange plate means around said hole inside said casing,
C. a first pipe coupled to and extending outwardly from said nipple portion,
D. an elbow member inside said casing having a slide plate means fitting to said flange plate means and sealingly connecting said elbow member to said flange plate means,
E. a vertical track comprising parallel flanges along the parallel vertical side edges of one of said plate means forming a C-shaped horizontal cross-section track opening towards the other of said plate means,
F. a second pipe in said casing connected to the other end of said elbow member, and
G. means on said nipple portion to clamp said flange plate means against the inside of said casing and said nipple in said hole,

the improvement comprising:

H. a hook means on the top of said slide plate means which extends over the top and behind the upper end of said flange plate means.

4,042,021

CONNECTION BETWEEN WATER TUBES

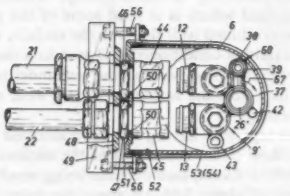
Bror Ingvar Forsell, Goteborg, Sweden, assignor to RP Rorprodukter AB, Goteborg, Sweden

Filed Apr. 16, 1976, Ser. No. 677,540

Claims priority, application Sweden, May 7, 1975, 7505328; Mar. 29, 1976, 7603739

Int. Cl.² E21B *33/03*

U.S. Cl. 166—85 **7 Claims**



1. In a well having a well casing inserted therein, an improved coupling arrangement for removable interconnection, at a point below ground level of a vertically extending pipe inserted into said well and a pipe leading to a pump, said coupling comprising a coupling head, a lateral passage in said coupling head, said lateral passage being adapted to be connected to the upper end of said vertically extending pipe, a seat connected to said pump pipe and adjacent said lateral passage, said lateral passage being adapted to sealingly abut against said seat, the improvement comprising a lateral connecting branch provided on said coupling head adapted to be connected to said vertically extending pipe, an eccentric mounted on said coupling head for rotation about a vertically extending axis, an actuating rod operably connected to said eccentric to effect turning movement of said eccentric, said actuating rod being adapted to extend vertically through said coupling head and having an upper portion positioned adjacent the ground level for actuation, said eccentric arranged, when turned in one direction, to be urged against an abutment so as to displace said coupling head in the lateral direction until said connecting branch thereon engages in and sealingly abuts against said seat.

4,042,022

DEVICES FOR CENTRALIZING PIPES IN BORINGS

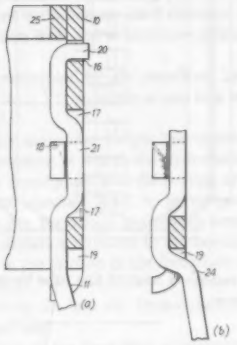
Stephen Francis Edmund Wills, and Henry Edward Pledger, both of Bedford, England, assignors to Weatherford Oil Tool (U.K.) Limited, Norfolk, England

Filed Oct. 6, 1975, Ser. No. 619,859

Claims priority, application United Kingdom, Oct. 8, 1974, 43544/74; Feb. 21, 1975, 7425/75

Int. Cl.² E21B *17/10*

U.S. Cl. 166—241 **9 Claims**



1. A centralising device comprising:

a. a plurality of blades each having a bent portion at both ends substantially at right angles to a portion of the blade adjacent the ends;
b. a pair of substantially cylindrical collars adapted to receive and carry the blades and each having at least two parts detachably connected to each other and including a locating slot for receiving each blade end;
c. pairs of deformable metal fixing projections carried on each of said collars and extending inwardly therefrom for securing each of said blades to said collars, whereby when the blades are fitted so as to lie internally of the collars, each bent end portion of said blades fits into one of said locating slots in each of said collars and said projections are deformed so as to lie on the face of said blade portions remote from the collars to thus fix said blade portions to said collars.

4,042,023

CONTROL LINE PROTECTOR

Roy Kelvin Noel Fox, Great Yarmouth, England, assignor to Weatherford Oil Tool Co., Inc., Houston, Tex.

Filed Sept. 3, 1975, Ser. No. 610,066

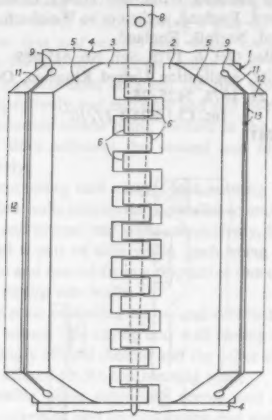
Claims priority, application United Kingdom, Sept. 12, 1974, 39784/74

Int. Cl.² E21B *17/10*

U.S. Cl. 166—241 **9 Claims**

1. In a positioning device, for insertion in a space between a well lining pipe and flow tubing in said well lining pipe, having a body adapted to seat about said flow tubing, said body having an internal face to abut against the flow tubing and an external face remote from the internal face, the improvement that said

body includes at least one rib of a resiliently deformable material containing a recess which opens at said external face and is



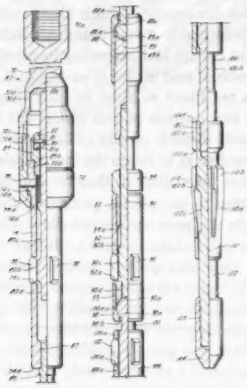
adapted to receive a control line tube by resilient deformation of said portion.

4,042,024

SUBSURFACE WELL APPARATUS HAVING FLEXING MEANS AND METHOD OF USING SAME

James D. Mott, Houston, Tex., assignor to Hydril Company

Division of Ser. No. 580,228, May 23, 1975. This application June 7, 1976, Ser. No. 693,326
Int. Cl.[2] E21B *23/00*
U.S. Cl. 166—243 **3 Claims**



1. A retrieving tool apparatus for retrieving an articulated surface-controlled subsurface safety valve having a flow controlling valve element and a tubular valve operator from a subsurface operating location in a well tubing where the safety valve is operably secured by using through-the-flowline techniques, including:

a retrieving tool body having means for connecting with a through-the-flowline carrier tool for moving the retrieving tool body to and from the subsurface valve operating location in the well, said retrieving tool body movable into the tubular valve operator;

said retrieving tool body having means for releasing the tubular valve operator from the subsurface operating location when said retrieving tool body moves into the tubular valve operator;

means mounted with said retrieving tool body for releasably securing the secured articulated safety valve with the retrieving tool body;

said means for releasably securing also operates the safety valve to release the safety valve from the secured condition and enable movement of the released safety valve with the retrieving tool body from the subsurface operating location; and

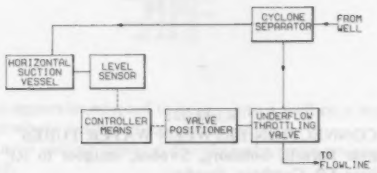
said retrieving tool body having a first body portion and a second body portion and means for connecting said first body portion and said second body portion for enabling limited angular movement of said first body portion relative to said second body portion wherein said retrieving tool body flexes.

4,042,025

HYDRAULIC CONTROL SYSTEM UNDERFLOW VALVE CONTROL METHOD AND APPARATUS

David R. Skinner, Odessa; Miles L. Sowell, and Marvin W. Justus, both of Levelland, all of Tex., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed Sept. 17, 1976, Ser. No. 724,060
Int. Cl.[2] E21B *43/00*
U.S. Cl. 166—250 **8 Claims**



1. A control system for a well-fluid hydraulic pumping unit of the type wherein an above-ground pump, driven by a substantially constant-speed prime mover, supplies a flow of pressurized fluid, at least some of which is used as power fluid to a downhole hydraulically actuated pump, which downhole pump returns fluid which is at least some of the power fluid together with produced well fluids to the surface, a portion of which return fluid is conditioned and sent to a suction vessel for use as power fluid and wherein the remainder of the return fluid is sent to a flowline as output of the well, said control system comprising:

a. a cyclone separator having an inlet connected to the well, and overflow outlet connected to the suction vessel, and an underflow outlet, said cyclone being sized to have an inlet flow of about 1.05–1.5 times the inlet flow of the power-fluid pump;

b. an underflow throttling valve connected between said cyclone underflow outlet and the flowline;

c. an underflow valve positioner connected to control the position of said underflow valve;

d. level-sensing means to produce a signal indicative of the liquid level in the suction vessel; and

e. controller means connected to receive the level-sensing means signal and having an output connected to said underflow valve positioner, said controller means generating an output signal to adjust the position of the underflow valve to maintain the liquid level in the suction vessel essentially constant.

7. A method for controlling a well-fluid hydraulic pumping unit of the type wherein an above-ground pump is driven by a substantially constant-speed prime mover and takes fluid from a suction vessel and supplies a flow of pressurized fluid, at least some of which is used as power fluid to a downhole hydraulically actuated pump, which downhole pump returns fluid, which is at least some of the power fluid together with produced well fluids to the surface, a portion of which return fluid is conditioned and sent to the suction vessel and wherein the remainder of the return fluid is sent to a flowline as output of

the well, and wherein a bleed flow is taken from the suction vessel to the flowline said method comprising:

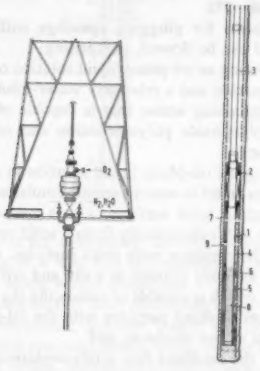
a. sizing a cyclone separator to have a inlet flow of about 1.05–1.25 times the inlet flow of the power-fluid pump plus the bleed flow from the suction vessel;
b. sensing the liquid level in the suction vessel;
c. a valve between said cyclone underflow outlet and the flowline; and
d. adjusting the throttling of said underflow valve as a function of the level in said suction vessel to maintain the level in said suction vessel, whereby the level in the suction vessel, proper flow to the cyclone, and an unplugged underflow from said cyclone are simultaneously maintained.

4,042,026

METHOD FOR INITIATING AN IN-SITU RECOVERY PROCESS BY THE INTRODUCTION OF OXYGEN

Gunter Pusch, Celle; Heinz Jurgen Klatt, Hohne, and Walter Frohlich, Wietze, all of Germany, assignors to Deutsche Texaco Aktiengesellschaft, Hamburg, Germany

Filed Feb. 5, 1976, Ser. No. 655,594
Claims priority, application Germany, Feb. 8, 1975, 2505420
Int. Cl.² E21B *43/24*
U.S. Cl. 166—258 **15 Claims**



1. A method for starting the operation of a process for the recovery of energy raw materials from a subterranean formation penetrated by a borehole comprising the steps of:

a. introducing into the upper region of said formation igniters known per se,
b. simultaneously introducing into the lower region of said formation an inert gas thereby preventing intrusion of said igniters into said lower region,
c. subsequently introducing a gas with a predetermined oxygen concentration and injection rate into the lower region until ignition occurs and a combustion front is formed as indicated by a corresponding increases in temperature,
d. continuing injection of said gas at said injection rate until the combustion front has been moved a predetermined distance into said formation,
e. increasing said injection rate of said gas and/or oxygen concentration in said gas to a maximum rate and/or concentration respectively,
f. injecting the said gas with the final oxygen concentration through at least one radially arranged outlet opening into the formation with a pressure ratio of flow-in pressure to discharge pressure at the outlet opening of 1.2 to 2.5, and
g. simultaneously injecting water into the upper region of said formation.

4,042,027

RECOVERY OF PETROLEUM FROM VISCOUS ASPHALTIC PETROLEUM CONTAINING FORMATIONS INCLUDING TAR SAND DEPOSITS

Joseph C. Allen, Bellaire, and Charles D. Woodward, Houston, both of Tex., assignors to Texaco Inc., New York, N.Y.

Continuation-in-part of Ser. No. 344,302, March 23, 1973, abandoned. This application June 24, 1974, Ser. No. 482,044
Int. Cl.² E21B *43/24*
U.S. Cl. 166—260 **18 Claims**

1. A method for recovering petroleum from a subterranean, porous, permeable formation containing petroleum having a high asphaltic content including tar sand deposits, penetrated by at least one injection well and at least one production well comprising:

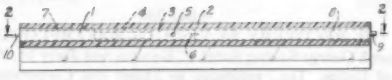
a. cooling a low molecular weight paraffinic hydrocarbon solvent having from 2 to 6 carbon atoms to a temperature less than 150° F.;
b. injecting said low molecular weight hydrocarbon into the formation at a pressure at which the hydrocarbon solvent is entirely in the liquid phase into the portion of the formation adjacent the injection well, to precipitate asphaltic materials from the formation petroleum present in the portion of the formation adjacent to the injection well on the sand grains in the portion of the formation adjacent to the injection well;
c. thereafter injecting air into the formation following the solvent injection, and
d. igniting a portion of the formation adjacentthe injection well to initiate an in situ combustion reaction in the portion of the formation contacted by said solvent, said in situ combustion reaction utilizing the precipitated asphaltic material as fuel; and
e. recovering petroleum from the formation via the production well.

4,042,028

ADJUSTABLE TUBE SHADE ROLLER

John W. Ennes, 26738 Columbia St., and John P. Ennes, 26374 Liberty Drive, both of Hemet, Calif. 92343

Filed Nov. 28, 1975, Ser. No. 636,109
Int. Cl.² A47G *5/02*
U.S. Cl. 160—263 **11 Claims**



1. A window shade roller comprising:

a main body including a tube, the opposite ends of said tube being open, said tube being adapted to have a window shade wound thereon;
a first shaft receivable in said one end of said tube, said first shaft including a motor tip exposed adjacent said one end of said tube;
means for drivingly coupling the first shaft to the tube so that the first shaft and the tube can rotate together;
a second shaft including a shaft tip, said second shaft being received within the other end of said tube with the shaft tip exposed at said other end of said tube;
adjustable means for limiting the innermost axial position of one of the shaft within the tube whereby the length of the window shade roller can be adjusted;
means for limiting the amount the other of the shafts can be inserted into the tube; and
said adjustable means including an insert mounted within said tube and adjustable length means cooperating with the insert to positively limit the innermost axial position of said one shaft within the tube.

4,042,029

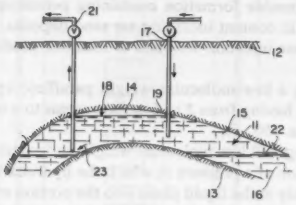
CARBON-DIOXIDE-ASSISTED PRODUCTION FROM EXTENSIVELY FRACTURED RESERVOIRS

Jan Offeringa, Rijswijk, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 571,463, April 25, 1975, abandoned, and Ser. No. 586,106, June 11, 1975, abandoned. This application Jan. 9, 1976, Ser. No. 647,954

Int. Cl.[2] E21B *43/26*

U.S. Cl. 166—272 10 Claims



1. In a process for producing oil from an extensively fractured reservoir in which oil is contained in matrix blocks of relatively low permeability which are surrounded by a network of interconnected fractures of relatively high permeability, the improvement comprising:

treating the reservoir by injecting or producing fluid to the extent necessary to form within the fracture network a substantially gas-filled gas layer which (a) overlies a substantially oil-filled liquid layer, and (b) surrounds a multiplicity of relatively low permeability oil-containing matrix blocks;

injecting fluid which contains or comprises CO_2 in a manner such that gaseous CO_2 flows into the gas layer within the fracture network in an amount sufficient to provide a CO_2 partial pressure of at least about 30% of the total pressure in at least a lower portion of the gas layer;

producing an oil-containing liquid that is substantially free of undissolved gas from within the liquid layer; and

correlating the rates and locations of the injections and productions of fluid so that the interface between the gas and liquid layers is kept at selected depths within the network of fractures while the swollen oil is being displaced into and produced from the network of fractures.

4,042,030

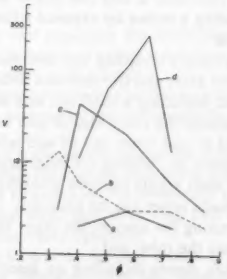
OIL RECOVERY BY VISCOUS WATERFLOODING

Joseph George Savins; Ralph F. Burdyn, and Jerry M. Waite, all of Dallas, Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed May 24, 1976, Ser. No. 689,445

Int. Cl.[2] E21B *43/22*

U.S. Cl. 166—273 21 Claims



1. In a method for the recovery of oil from a subterranean oil reservoir penetrated by spaced injection and production systems wherein an aqueous fluid is introduced into said reservoir via said injection system to displace oil to said production system, the improvement comprising employing as at least a portion of the fluid introduced into said injection system a viscous aqueous fluid having a monovalent salt salinity within the range of 0.8–2.5 weight percent and containing an alkyl aryl sulfonate surfactant having an average molecular weight within the range of 350–500 in a concentration within the range of 0.5–3.0 weight percent and a water-soluble C_4-C_6 aliphatic alcohol having a hydrocarbon chain length of at least 3 carbon atoms in a concentration to provide a ratio ϕ of said sulfonate surfactant to the sum of said sulfonate surfactant and said alcohol within the range of 0.3–0.8.

4,042,031

PLUGGING SUBTERRANEAN EARTH FORMATIONS WITH AQUEOUS EPOXY EMULSIONS CONTAINING FINE SOLID PARTICLES

Randolph H. Knapp, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 631,774, Nov. 13, 1975, Pat. No. 4,000,781, which is a continuation-in-part of Ser. No. 571,195, April 24, 1975, abandoned. This application Aug. 12, 1976, Ser. No. 713,758

The portion of the term of this patent subsequent to Jan. 4, 1994, has been disclaimed.

Int. Cl.[2] E21B *33/138, 43/04*

U.S. Cl. 166—276 10 Claims

1. A process for plugging openings within a region into which fluid can be flowed, comprising:

compounding an oil-phase liquid solution of a polymerizable polyepoxide and a relatively water-soluble tertiary nitrogen-containing amine that is capable of both catalyzing the polyepoxide polymerization and oil-wetting a solid surface;

dispersing the oil-phase liquid solution in an aqueous liquid to form an oil-in-water cationic emulsion which is capable of wetting solid surfaces with a resin-forming solution which will subsequently form a solid resin;

mixing the emulsion with solid particles, which are at least about as finely divided as a silt, and with an aminoalkoxy silane which is capable of enhancing the oil-wetting of the surfaces of those particles with the oil-phase liquid component of the emulsion; and

flowing the resultant fine solids-containing suspension into and keeping it relatively static within the openings to be plugged, until the resin-forming components have formed a solid resin.

4,042,032

METHODS OF CONSOLIDATING INCOMPETENT SUBTERRANEAN FORMATIONS USING AQUEOUS TREATING SOLUTIONS

Buddy W. Anderson, Lafayette, La.; Bobby K. Bowles, Comanche, Okla.; Joseph R. Murphey, Duncan, Okla.; Kenneth D. Totty, Duncan, Okla., and Bill M. Young, Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Continuation-in-part of Ser. No. 367,918, June 7, 1973. This application Oct. 2, 1975, Ser. No. 618,776

Int. Cl.[2] E21B *33/13, 43/04*

U.S. Cl. 166—276 93 Claims

1. A method of consolidating loose or incompetent sands in a formation penetrated by a well bore comprising the steps of:

contacting said formation with an aqueous preflush solution to condition said formation for the acceptance of a hardenable organic consolidating fluid capable of coating sand in an aqueous environment;

contacting said formation with said hardenable organic consolidating fluid so that at least a portion of said loose or incompetent sands are coated thereby;

contacting said formation with a spacer solution so that said

hardenable organic consolidating fluid is distributed therein; and

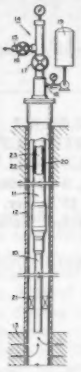
causing said consolidating fluid to harden thereby forming a hard permeable mass in said formation.

4,042,033

COMBINATION SUBSURFACE SAFETY VALVE AND CHEMICAL INJECTOR VALVE

Warren E. Holland, and Martin E. True, both of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed Oct. 1, 1976, Ser. No. 728,683
Int. Cl.[2] E21B *43/00, 43/12*
U.S. Cl. 166—310 **10 Claims**



1. An apparatus for controlling the flow of fluids through the tubing string of a well and for injecting a chemical fluid into said tubing string which comprises:

a. a pressure responsive, fluid controlled safety valve;

b. pressure responsive injector means for injecting said chemical fluid into said tubing string of said well; and

c. conducting means, connected to said injector means, for supplying said chemical fluid to said injector means, said conducting means also being connected to said safety valve whereby said chemical fluid serves as the pressure control fluid for said safety valve.

4,042,034

METHOD FOR INCREASING THE RECOVERY OF NATURAL GAS FROM A GEO-PRESSURED AQUIFER

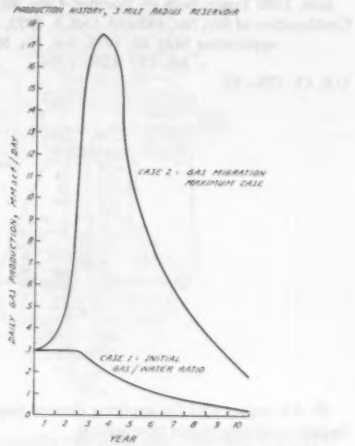
Harold L. Cook, Jr., and Ernest C. Geer, both of Houston, Tex., assignors to Transco Energy Company, Houston, Tex.

Continuation-in-part of Ser. No. 589,300, June 23, 1975, abandoned. This application May 24, 1976, Ser. No. 689,622
Int. Cl.[2] E21B *43/00*
U.S. Cl. 166—314 **10 Claims**

1. A method of increasing the recovery of natural gas from a geo-pressured aquifer containing water and gas in solution in the water and a zone of free gas dispersed in water comprising,

providing one or more wells extending from the surface and completed in the geo-pressured aquifer in said zone,

allowing the geo-pressured aquifer to flow water and natural gas under aquifer pressure through the well so as to lower the pressure in the aquifer sufficiently to allow a portion of the free gas dispersed in the water and a portion of the gas in solution to be released from the water whereby the


PRODUCTION HISTORY, 3 MILE RADIUS RESERVOIR
DAILY GAS PRODUCTION, MMSCF/DAY
CASE 2 : GAS MIGRATION MAXIMUM CASE
CASE 1 : INITIAL GAS / WATER RATIO
YEAR

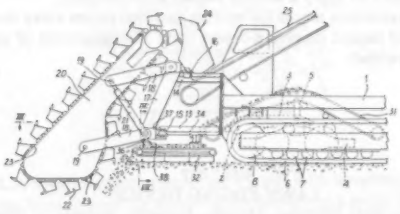
released natural gas will migrate more freely to the well and be produced.

4,042,035

APPARATUS FOR REMOVING, CLEANING AND REPLACING RAILROAD BALLAST

Jean Jacques Boyer, Montchauvet, France, assignor to Societe Anonyme Secmafer, Buchelay, Mantes, France

Filed July 2, 1976, Ser. No. 702,119
Claims priority, application France, July 2, 1975, 75.20742
Int. Cl.[2] E01B *27/08*
U.S. Cl. 171—16 **5 Claims**



1. Apparatus for removing, cleaning and redepositing railroad ballast, comprising a chassis mounted on endless treads, a bucket elevator mounted for horizontal swinging movement about a first vertical axis at the forward end of the chassis, means to receive and clean ballast from the bucket conveyor, and a conveyor belt whose upper run moves forwardly, for redepositing ballast from said cleaning means, means mounting said conveyor belt for horizontal swinging movement about a second vertical axis disposed adjacent the rear of the conveyor belt, the second axis being forward of the first axis, and means interconnecting a forward portion of the conveyor belt for horizontal swinging movement with and relative to said bucket conveyor about a third vertical axis.

4,042,036

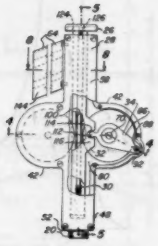
ELECTRIC IMPACT TOOL

James E. Smith, 217 Meadowlook Way, and James D. Cunningham, 2100 Topaz, both of, Boulder, Colo. 80302

Continuation of Ser. No. 403,493, Oct. 4, 1973, abandoned. This application May 23, 1975, Ser. No. 580,246

Int. Cl.[2] B25C *1/06*

U.S. Cl. 173—13 34 Claims



23. An impact tool for applying desired impact forces to an impact receiving object comprising:

a housing defining a drive path;

a flywheel having a peripheral edge and mounted on said housing;

means for rotating said flywheel;

elongate ram means having a rear end, an impacting end, and a side, said ram being mounted in said housing for movement toward and away from said impact receiving object from a repose position in which a central portion of said ram side is located immediately adjacent said flywheel peripheral edge and said rear end is spaced apart therefrom, into an impacting position in which said ram rear end is located immediately adjacent said flywheel peripheral edge;

means supporting at least one of the ram means and flywheel for movement relative to the other from normal spaced positions to an operating position with the side of said ram means engaged against the periphery of said flywheel in a tangential manner;

control means for moving said flywheel and ram means into driving engagement to move said ram means along said drive path in a direction toward said impact receiving object to apply a desired impact force thereto;

and retraction means for moving said ram means away from said impact receiving object upon disengagement of said flywheel.

4,042,037

LAWN EDGING DEVICE

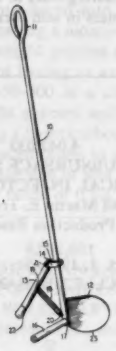
William Bede Whiteley, Orange, Australia, assignor to Marie Ellen Whiteley, Orange, Australia

Filed Nov. 25, 1975, Ser. No. 635,485

Claims priority, application Australia, Dec. 3, 1974, 1861/74; May 5, 1975, 1483/75

Int. Cl.[2] A01B *35/26, 1/00*

U.S. Cl. 172—13 2 Claims

1. A lawn edging device comprising an elongated shank having a handle portion disposed at one end thereof, a planar cutting member having a sharpened lowermost cutting edge, and an upright straight edge fixed to the other end of the shank so that said cutting member extends from the shank in only a first direction, a footrest bar extending from the lower end of the shank at right angles to said first direction, an elongate member pivotally connected at one end thereof to the opposite side of said shank from said cutting member, and spring means connecting said elongate member to a point adjacent said other

end of said shank and normally biasing said elongate member towards said shank.

4,042,038

ROTARY HARROWS WITH SUPPORTING MEMBER POSITIONED TO PROTECT SOIL WORKING MEMBERS

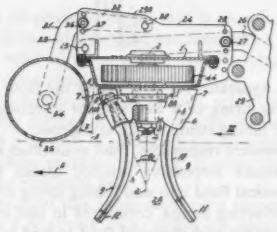
Cornelis van der Lely, Zug, Switzerland

Filed Feb. 27, 1975, Ser. No. 553,607

Claims priority, application Netherlands, Mar. 1, 1974, 7402786

Int. Cl.[2] A01B *33/06, 49/02*

U.S. Cl. 172—59 21 Claims



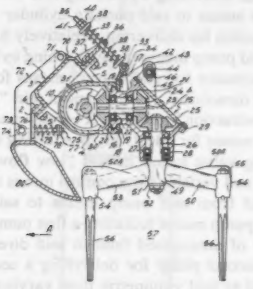
18. A rotary harrow comprising an elongated hollow frame portion and a plurality of rotatable soil working members supported on that portion, said soil working members being rotatable about upwardly extending axes positioned in a row that extends transverse to the normal direction of travel and being journalled in said frame portion, an elongated ground engaging supporting member being connected to said frame portion and being located immediately in front of said row of soil working members with respect to the direction of travel of the harrow, said supporting member extending for substantially the entire working width of said row and having a cross-section, the greatest dimension of which extends substantially parallel to the direction of travel, said soil working members comprising supports with depending tines fastened to those supports, said supporting member having an external circumference surface that, in part, faces immediately adjacent connections between said supports and their corresponding tines, said supporting member being positioned to press on the soil in advance of the soil working members and protect said members and frame portion during travel and said circumference surface part extending downwardly and away from the soil working member supports, whereby the distances between that part and the supports increases towards the soil, the rearmost portion of the circumference surface of said supporting member being located substantially directly beneath the frame

portion and adjacent same, said rearmost portion being in general horizontal alignment with the upper portions of said soil working members.

4,042,039
ROTARY HARROWS

Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Filed Aug. 28, 1975, Ser. No. 608,564
Claims priority, application Netherlands, Sept. 3, 1974, 7411643
Int. Cl.² A01B *33/06, 33/14*
U.S. Cl. 172—59 **67 Claims**



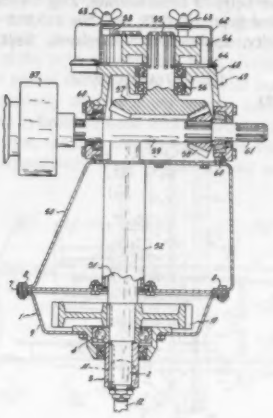
1. A rotary harrow comprising a frame having an elongated frame portion, said portion extending transverse to the normal direction of travel of said harrow, a plurality of soil-working members being mounted side by side and being rotatable about upwardly extending axes defined by corresponding shafts supported on said portion, driving means connected to rotate said shafts and the shafts of adjacent soil-working members being rotated in relative opposite directions, each soil-working member comprising support means having downwardly extending tines and the tines of said members being rotatable about said shafts to work adjoining circular paths, the diameter of the circle defining each path substantially equalling or exceeding the distance between the axes of rotation of two adjacent soil-working members, at least some of said soil-working members being pivotable with repect to adjacent soil-working members about respective pivot axes that extend transverse to the direction of travel, each pivotable soil-working member being displaceable as a unit with respect to an adjacent member responsive to contact with obstacles in and on the ground.

4,042,040
CULTIVATORS

Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Division of Ser. No. 450,738, March 13, 1974, Pat. No. 3,971,445, which is a continuation of Ser. No. 233,113, March 9, 1972, abandoned. This application May 11, 1976, Ser. No. 685,361
Int. Cl.² A01B *33/06, 33/08*
U.S. Cl. 172—59 **4 Claims**

1. A cultivator comprising a row of soil working members that are rotatable about upwardly extending axes defined by corresponding shafts, said shafts each having a pinion, the teeth of which are in mesh with neighboring pinions, at least one shaft of a soil working member being drivenly connected to an input shaft that is connectable to the p.t.o. of a prime mover and said one shaft being connected to said input shaft through a transmission mechanism, said mechanism comprising an upwardly extending transmission shaft and an extension of said one upwardly extending shaft, and transmission shaft and extension extending substantially parallel to one another and having respective pinion gears at their upper ends, said gears being in engagement with one another and having different numbers of teeth whereby the gears are exchangeable with one another to vary the speed of rotation of said soil working members, pinion gears being located at the top of said mechanism and being rotated about upwardly extending axes during

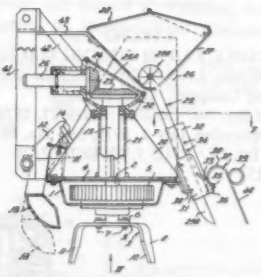


operation, said upwardly extending shaft extension being positioned in front of said transmission shaft with respect to the direction of cultivator travel.

4,042,041
ROTARY HARROWS

Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Continuation of Ser. No. 504,076, Sept. 9, 1974, abandoned, which is a division of Ser. No. 312,882, Dec. 7, 1972, abandoned. This application Mar. 27, 1975, Ser. No. 562,415
Claims priority, application Netherlands, Dec. 8, 1971, 7116820
Int. Cl.² A01B *33/06*
U.S. Cl. 172—70 **5 Claims**



1. A rotary harrow comprising a frame with coupling means at the front thereof for attaching the harrow to a prime mover, an elongated portion of said frame extending transverse to the direction of travel and a plurality of soil-working members rotatably mounted on upwardly extending shafts supported on said transverse frame portion, drive means connected to said shafts and said soil-working members being rotatable by said drive means, an elongated ground engaging member being positioned in front of said soil-working member and extending for substantially the entire working width of said harrow, said ground engaging member being pivoted to said frame and deflectable against resilient opposition in a forward direction, said member being pivotable about an axis that extends substantially horizontally and perpendicular to the direction of travel, said axis being located substantially in vertical alignment with said ground engaging member.

4,042,042

SOIL CULTIVATING MACHINES

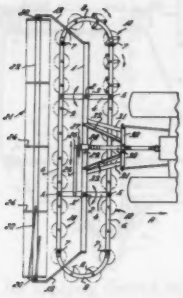
Cornelis van der Lely, 73 Bruschenrain, Zug, Switzerland

Filed Sept. 16, 1975, Ser. No. 613,885

Claims priority, application Netherlands, Sept. 16, 1974, 7412227

Int. Cl.[2] A61B *19/06*

U.S. Cl. 172—91 **10 Claims**



6. A soil cultivating machine comprising a frame with two elongated transverse beams, including a forward beam and a rear beam, said beams extending substantially horizontal and being spaced apart from one another with respect to the direction of normal travel of the machine, driving means connected to move said beams back and forth about substantially vertical axes and in directions transverse to said direction of travel, each beam supporting a plurality of cultivating members mounted along the length thereof and each beam having outer ends, the adjacent outer ends of the forward and rear beams being linked to one another by respective coupling members and further cultivating members being mounted along the lengths of said coupling members, said coupling members being supported by said beams and defining working sides of the machine, said coupling members being moved back and forth by the movements of said beams during operation.

4,042,043

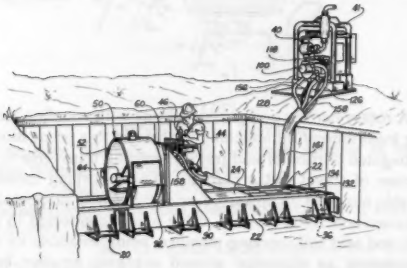
PORTABLE EARTH BORING MACHINE

William S. Appleman, Ashland, Ohio, assignor to The Richmond Manufacturing Company, Ashland, Ohio

Continuation of Ser. No. 455,254, March 27, 1974, abandoned. This application July 2, 1975, Ser. No. 592,791

Int. Cl.[2] E21D *9/02*; E02D *7/28*

U.S. Cl. 173—152 **2 Claims**



1. An earth boring apparatus for drilling holes and pushing casing sections therein, said apparatus comprising, in combination, track means; casing pusher means on said track means for engaging the rear end of a casing section; pushing cylinder means for moving said casing pusher means along said track means and including an extension chamber and a retraction chamber; auxiliary frame means for disposition at a location remote from said main frame means; an engine mounted on said auxiliary frame means; pump means driven by said engine for delivering pressurized fluid to said pushing cylinder means; conduit means connecting said pushing cylinder means with said pump means; control means including a directional valve means in the flow of pressurized fluid from said pump means to said pushing cylinder means, said directional valve means including a "closed center" position for isolating both of said chambers from said flow, an "extension" position for pressurizing said extension chamber and draining said retraction chamber, and a "retract" position for pressurizing said retraction chamber and draining said extension chamber; volumetric flow varying controller in said control means and including a "low flow" position for delivering a relatively low volumetric flow from said pump means to said pushing cylinder means and a "high flow" position for delivering a relatively high volumetric flow from said pump means to said pushing cylinder means; a first manual actuator for said control means for selectively positioning said directional valve means in said "center", "extension", and "retraction" positions; a second manual actuator for said control means for selectively positioning said volumetric flow varying valve means in said "low flow" and "high flow" positions and variable flow control means in the flow of pressurized fluid from said pump means to said directional controller, said pump means including a first pump for delivering a first flow of pressurized fluid to said directional valve means, and a second pump for delivering a second flow of pressurized fluid to said volumetric flow varying controller.

4,042,044

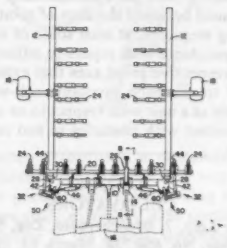
REAR FOLDING IMPLEMENT

Darrel Lee Honnold, Winterset, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Apr. 12, 1976, Ser. No. 675,813

Int. Cl.[2] A01B *65/02*

U.S. Cl. 172—311 **25 Claims**



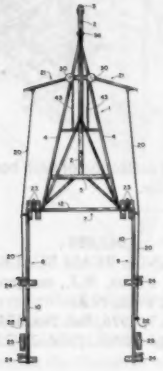
23. A folding implement comprising: elongated beams extending in a transversely aligned disposition; a vertical hinge connecting the adjacent ends together to permit said beams to swing between an extended position in which the beams are transversely aligned and a rearward folded position in which one beam trails in a fore-and-aft disposition with respect to the other; elevating means on one of the beams; a toolbar offset rearwardly from the beams and carried on said elevating means, said toolbar extending transversely beyond said hinge to an overlapping end portion behind the adjacent beam; transversely spaced rearwardly extending tools mounted on the aforesaid adjacent beam to said overlapping end portion, and on the toolbar along its length; and power means on the beam with said elevating means for rocking the toolbar and the tools mounted thereon so that the latter project upwardly and at a level above the tools on the aforesaid adjacent beam to thereby permit said beams to move to and from their folded positions without creating interference between the tools.

4,042,045

MULTIPLE SECTION FARM IMPLEMENT WITH BIASED SWINGING ARM STRUCTURE FOR ATTACHING REINFORCING MEMBER TO MAIN FRAME

Kenneth A. Hake, Tipton, Kans., assignor to Kent Manufacturing Co., Inc., Tipton, Kans.

Filed June 23, 1975, Ser. No. 589,127
Int. Cl.[2] A01B 73/00
U.S. Cl. 172—311 **12 Claims**



1. In a multiple section farm implement having a main frame and a wing frame which is rearwardly foldable from an operating configuration to a transporting configuration, and vice versa, said wing frame being adapted for mounting of soil conditioning members thereon and having elongated, flexible reinforcing members attached thereto which extend to said main frame, the improvement for attaching said reinforcing members to said main frame, comprising:

a. swinging arm members each having an inner end thereof pivotally attached to the main frame, and an outer end thereof attached to one end of one of said reinforcing members at a point of connection; said arms rotating laterally of said main frame along a normally substantially horizontal plane; said arm members being pivoted forwardly wherein each point of connection is disposed adjacent to said main frame in an operating configuration, and being pivoted rearwardly wherein each point of connection is spaced apart from said main frame in a transporting configuration;

b. biasing means whereby rearward pivoting of said arm members is partially resisted during folding of the wing frame to a transporting configuration, and whereby each arm member point of connection is urged to pivot forwardly to a position adjacent to said main frame when said wing frame is folded to an operating configuration; and

c. latching means whereby said arm members are latched in said operating configuration and unlatched for pivoting each reinforcing member point of connection outwardly of said main frame during the folding of said wing frame to said transporting configuration.

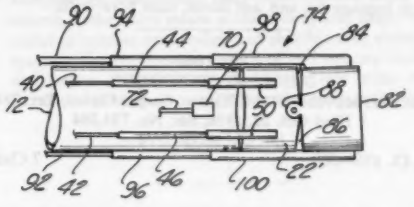
4,042,046

DIRECTIONAL CONTROL MECHANISM FOR UNDERGROUND DRIVEN PIPES AND CONDUITS

Anastasio Capoccia, Wixom, Mich., assignor to The Richmond Manufacturing Company, Ashland, Ohio

Filed Mar. 27, 1974, Ser. No. 455,188
Int. Cl.[2] E21B 7/04
U.S. Cl. 175—73 **1 Claim**

1. A mechanism for controlling the direction of movement of a pipe being driven underground generally along a horizontal path, and wherein a mechanical device is employed at the rear end of the pipe to forcibly drive the pipe along the path, said mechanism comprising: a pipe; an auger means mounted coaxially within the pipe for removing earth in the path of the movement of the pipe; a cylindrical head pivotally mounted to the forward end of the pipe, said cylindrical head being pivotable independently of said auger means; control means for inclining said cylindrical head with respect to the longitudinal axis of said pipe, the movement of said cylindrical head being inclined independently with respect to said auger means; a



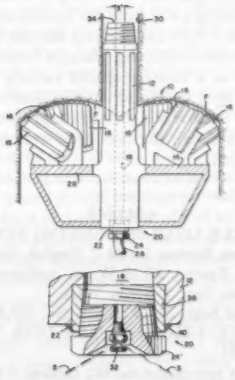
second cylindrical head pivotally carried by the forward end of said first mentioned cylindrical head for pivotal movement in a direction transverse to the direction of pivotal movement of said first mentioned cylindrical head and independently of said first mentioned cylindrical head to control the direction and movement of said pipe independently of said first head; second control means carried by said second head and extendable rearwardly of said pipe; and means for moving said second control means axially with respect to the longitudinal axis of said pipe for controlling the amount of inclination of said second cylindrical head with respect to said pipe axis.

4,042,047

RAISE BORING HEAD HAVING FLUID TRAVERSING MEANS

Charles R. Dively, and Russell K. Peterson, both of Seattle, Wash., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Continuation of Ser. No. 619,655, Oct. 6, 1975, abandoned. This application Nov. 11, 1976, Ser. No. 740,839
Int. Cl.[2] E21B 9/08
U.S. Cl. 175—340 **5 Claims**



1. A raise boring head having cuttings dust suppression means, comprising:

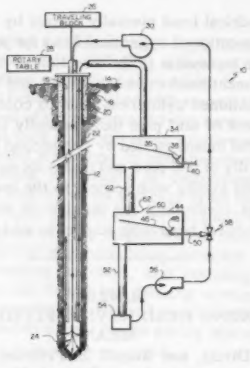
a passageway, formed in and traversing said raise boring head, for conducting a liquid, such as water, therethrough;
said raise boring head comprising a platform having a first, uppermost surface for mounting earth cutters thereto;
said platform also having a second, lowermost surface; wherein
said passageway has an outlet opening substantially centrally of said second surface; and including
means fixed in said outlet for discharging liquid therethrough in a conical-form spray pattern, to cause outlet-discharged liquid to form a dust-intercepting curtain and to impinge on, and wet down, raise bore walls.

4,042,048

DRILLING TECHNIQUE

Willie Carl Schwabe, 5925 Killarney, Corpus Christi, Tex. 78412

Filed Oct. 22, 1976, Ser. No. 734,884
Int. Cl.[2] E21B *7/16*
U.S. Cl. 175—380 **7 Claims**



1. Apparatus for shot drilling a well bore, comprising:
a hollow drill head having
an inlet section for receiving a drilling fluid-shot mixture; and
a bottom having a multiplicity of shoulders of generally tapered configuration providing a radially outermost apex extending away from the bottom center and defining a groove between adjacent shoulders, and a multiplicity of shot conducting passages opening through the shoulders at a location spaced radially inward of the shoulder apex providing communication between the drill head interior and each of the grooves for introducing shot between the drill head bottom and the well bore bottom.

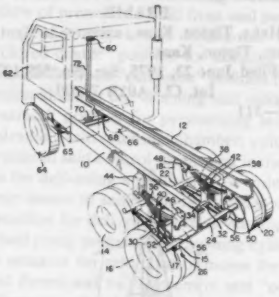
4,042,049

VEHICLE LOAD MEASURING SYSTEM

Keith W. Reichow, Renton; David C. English, Seattle, and Jerry L. McCauley, Renton, all of Wash., assignors to Structural Instrumentation, Inc., Tukwila, Wash.

Filed Sept. 29, 1975, Ser. No. 615,827
Int. Cl.[2] G01G *19/08, 3/14;* G01B *7/16*
U.S. Cl. 177—137 **24 Claims**

1. In a vehicle suspension having tandem wheels supported by forward and rear axles, an equalizing beam positioned at both sides of said vehicle, said equalizing beams having their forward ends connected with the forward axle, their rear ends connected with the rearward axle, and their midpoints pivotally supporting the frame of said vehicle, the improvement comprising a vehicle load monitor having a pair of transducer means operatively associated with respective of said equalizing



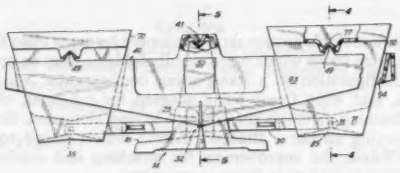
beams for indicating the deflection of such beams responsive to the weight of said vehicle.

4,042,050

BALANCE BEAM SCALE

Earl D. Myers, Scotch Plains, N.J., assignor to Ohaus Scale Corporation, Florham Park, N.J.

Filed Apr. 7, 1976, Ser. No. 674,509
Int. Cl.[2] G01G *21/24, 21/22*
U.S. Cl. 177—198 **17 Claims**



1. A balance beam scale which comprises:
a. a support member;
b. a balance beam pivotally mounted on said support member;
c. two weighing buckets, each of said buckets being pivotally mounted on a respective end of said balance beam, each of said buckets being open at the top for receiving therein an article to be weighed, the bottom of each of the said buckets being below the upper surface of said balance beam; and
d. a check lever pivotally secured to said buckets, adjacent to the bottom of said buckets.

4,042,051

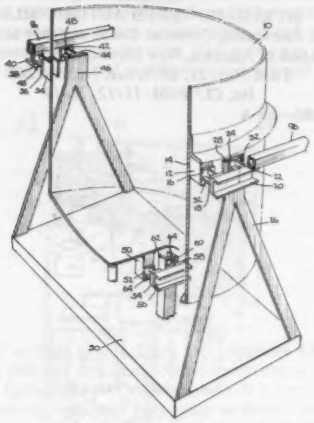
FLEXIBLY MOUNTED CONTAINER SYSTEM

Ronald J. Ricciardi, 108 Malcolm Drive, Garfield, N.J. 07026

Continuation-in-part of Ser. No. 498,124, Aug. 16, 1974, abandoned. This application Apr. 16, 1975, Ser. No. 568,551
Int. Cl.[2] G01G *21/24;* F16C *11/12*
U.S. Cl. 177—255 **15 Claims**

1. A flexibly mounted container system comprising a container, a mounting bracket fixedly mounted on said container, a first flange-like element fixedly mounted on said mounting bracket, a second flange-like element disposed in spaced parallel relationship with respect to said first flange-like element, a linking member fixedly mounted on said second flange-like element, a third flange-like element fixedly mounted on said linking member, a fourth flange-like element disposed in spaced, parallel relationship with respect to said third flange-like element, a support frame fixedly mounted on said fourth flange-like element, and a plurality of elongated resilient cross-members extending perpendicular to and interconnecting said

first and second and said third and fourth flange-like elements respectively, the cross-sectional area of said cross-members on any plane parallel to their respective flange-like elements col-



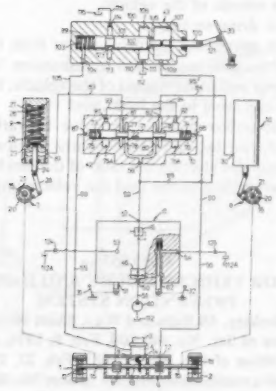
lectively being symmetrically disposed about a pivot axis extending perpendicular to their respective flange-like elements, and means for continuously detecting the movement of said container to determine the change in weight contained therein.

4,042,052

STEERING CLUTCH AND SINGLE PEDAL BRAKE CONTROL SYSTEM FOR CRAWLER TRACTOR

George Paul Koch, Springfield, Ill., assignor to Fiat-Allis Construction Machinery, Inc., Deerfield, Ill.

Filed Dec. 15, 1975, Ser. No. 640,753
Int. Cl.[2] B62D *11/08*
U.S. Cl. 180—6.7 7 Claims



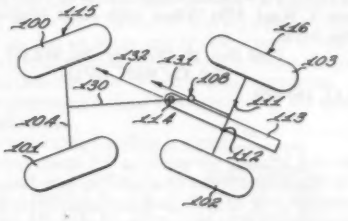
1. In a vehicle
an engine-driven transmission;
a pair of ground engaging drive means;
a pair of fluid actuated steering clutches for transmitting motive power from said transmission to said drive means;
a pair of brakes for said drive means;
a pair of hydraulic actuators for operating said brakes;
a pair of steering levers for said clutches;
a single brake pedal for said brakes;
a source of pressurized fluid;
and control means responsive to operation of said steering levers and said brake pedal to effect automatic application of both brakes if both steering levers are simultaneously operated to disengage both steering clutches when said single brake pedal is actuated,
and to effect application of one brake for one track if one steering lever is operated to disengage one steering clutch for said one track when said single brake pedal is actuated; said control means comprising steering valve means actuatable by said steering levers to operate said steering clutches by controlling fluid flow thereto from said source, brake valve means actuatable by said single brake pedal to operate said brakes and shuttle valve means responsive to fluid pressure in each of said steering clutches and further responsive to actuation of said brake valve to control fluid flow to and from said brake actuators.

4,042,053

FOUR-WHEEL DRIVE TRACTOR

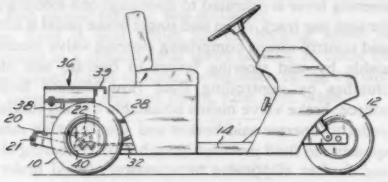
Gerald E. Sieren, Greendale, Wis., and Earl C. Musser, Madison, Ind., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Continuation-in-part of Ser. No. 536,089, Dec. 24, 1974, abandoned. This application Aug. 7, 1975, Ser. No. 602,840
Int. Cl.[2] B60D *1/14;* B60K *17/30, 17/32*
U.S. Cl. 180—51 12 Claims



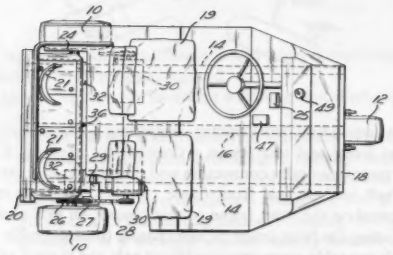
1. A four-wheel drive tractor comprising a chassis including a front frame and rear frame, a drawbar for applying a draft load, means pivotally connecting said drawbar to and carrying the draft load on said front frame of said chassis, an engine supported on the front frame of said chassis, an axle pivotally supporting the front frame of said chassis, front steerable drive wheels rotatably supporting said front axle and pivotal relative to said front axle for front-end steering, front wheel steering mechanism for steering the front wheels, a rear axle supporting said rear frame of said chassis, a pair of rear drive wheels rotatably supporting said rear axle, an articulating joint including vertically spaced pivotal bearings pivotally connecting said front frame which said rear frame of said chassis, an articulating steering mechanism for articulation of said front and rear frames, front wheel manual steering control means for steering said front wheels through said front wheel steering mechanism and rear wheel manual steering control means for steering said rear wheels of said tractor through said articulating steering mechanism, said front frame and said rear frame defining lenght ratios of approximately 3 to 1 with lengths from the center line of the articulating joint to the center line of the front axle relative to the center line of the articulating joint to the center line of the rear axle, means defining an operator station on said front frame of said chassis for operating said tractor.

4,042,054
VEHICLE AND BATTERY PACK
Eugene T. Ward, 5791 Wilson Mills Road, Highland Heights, Ohio 44143
Filed Dec. 18, 1975, Ser. No. 642,133
Int. Cl.[2] B60L *11/18*
U.S. Cl. 180—60 8 Claims



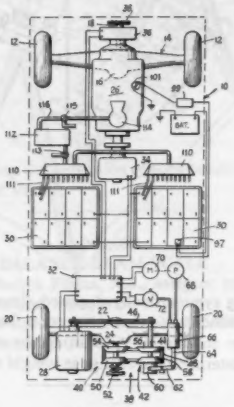
1. In an electrically driven vehicle, a unitary non-articulated chassis frame carrying a pair of drive wheels in the rear and steerable wheel means in the front, a rear axle, each drive wheel being mounted at its own end of the axle and being independently driven by its own motor and power linkage with no mechanical differential or other protuberance projecting upwardly from the center of the axle, a battery pack capable of ready removal and replacement and supported, in said absence of projection of any protuberance, immediately over the axle and removable rearwardly thereof, the battery pack being supported between the drive wheels and between the output ends of said power linkages, the weight of the battery pack being transmitted directly downwardly to the axle and thence to each wheel.

4,042,055
BATTERY POWERED VEHICLE AND DRIVE SYSTEM
Eugene T. Ward, 5791 Wilson Mills Road, Highland Heights, Ohio 44143
Filed Dec. 18, 1975, Ser. No. 642,135
Int. Cl.[2] B60L *11/18*
U.S. Cl. 180—60 4 Claims



1. In an electrically driven vehicle, driving wheel means carrying one end of the vehicle, steerable wheel means carrying the other end of the vehicle, the driving wheel means and the steerable wheel means being mounted together on a non-articulated unitary vehicle chassis, whereby the driving wheel means and the steerable wheel means share the weight of the vehicle without intervening chassis articulation between the driving wheel means and the steerable wheel means, the majority of the weight being on the driving wheel means but a substantial portion of the weight being on the steerable wheel means, the driving wheel means comprising a pair of drive wheels each with its own direct current motor drive, a non-rotating springing rear axle, each drive wheel being rotatably mounted at its own end of the axle, the motor drive for each wheel being mounted to maintain driving engagement with the rotatable mounting of the wheel during springing of the axle, switch means for alternatively connecting the motor drives to a power source in series or in parallel to provide respectively conditions of unlimited rotational slip and limited rotational slip between the drive wheels during power application.

4,042,056
HYBRID POWERED AUTOMOBILE
Elwood R. Horwinski, Cheshire, Conn., assignor to Automobile Corporation of America, New Haven, Conn.
Filed Nov. 21, 1975, Ser. No. 634,263
Int. Cl.[2] B60L *11/12, 11/14*
U.S. Cl. 180—65 A 6 Claims

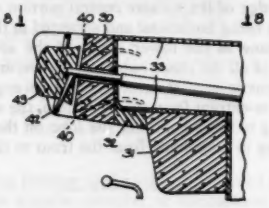


1. A hybrid powered automobile, comprising in combination:
a. a vehicle having wheels,
b. electric storage batteries,
c. an internal combustion engine,
d. an electric generator driven by said engine and connected to charge said batteries,
e. means including a clutch, providing a drive from the engine to wheels of the vehicle,
f. an electric drive motor,
g. means for energizing the drive motor from the batteries,
h. a variable-ratio mechanical transmission between the drive motor and other wheels of the vehicle, for imparting an electrical drive to the latter, and
i. automatic power means responsive to variation in the current drawn by, and consequently the loading of, the drive motor for altering the ratio of the mechanical transmission according to the load the vehicle imposes on said motor.

4,042,057
MOTOR VEHICLE INJURY AND DAMAGE PREVENTION SYSTEM
Addison S. Beckley, 48 Baltusrol Way, Short Hills, N.J. 07078
Continuation of Ser. No. 440,000, Feb. 6, 1974, abandoned, which is a division of Ser. No. 117,583, Feb. 22, 1971, Pat. No. 3,802,727, and a continuation-in-part of Ser. No. 35,720, May 8, 1970, Pat. No. 3,702,711. This application Dec. 23, 1975, Ser. No. 643,816
Int. Cl.[2] B60K *37/00*
U.S. Cl. 180—90 3 Claims

1. A motor vehicle capable of protecting passengers during frontal collisions comprising a vehicle body having a front windshield, an upwardly and rearwardly extending hood terminating inwardly of said windshield in a pad biasing top edge and an upper semi-rigid substantially vertical bracing wall, a lower semi-rigid substantially vertical bracing wall spaced forwardly of and lower than said upper bracing wall, a front passenger compartment with seat means for front seat occu-

pants providing a normal leg position, chest position and knees position of the occupants, a first massive pad of shock-absorbing material disposed across the front of the passenger compartment rearwardly of the windshield and with its upper surface braced against said biasing top edge and said upper bracing wall and being at least as high as the occupant's normal chest position and with its lower surface above the occupant's normal knee positions, and a second massive pad of shock-absorbing material disposed across said passenger compartment below and forward of said first-named pad and having a



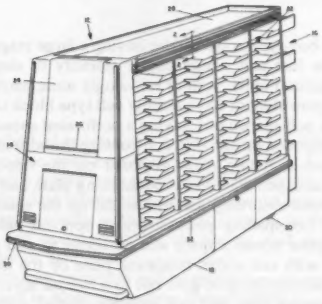
substantially vertical knee bracing face opposite to the occupant's leg position extending considerably above the knee position but below said first massive pad and braced adjacent said lower bracing wall, said pads being so shaped and placed that in combination they engage and brace both the upper body and legs simultaneously absorbing the kinetic energy of upper and lower portions, respectively, of bodies of front seat occupants as they are thrown forward and decelerated during a collision and reducing the likelihood of such occupants being thrown against or through a windshield.

4,042,058

EASILY ACCESSIBLE SWITCHES FOR MANUAL CONTROL OF AN AUTOMATICALLY CONTROLLED VEHICLE

Jack A. Cooper, Grand Rapids, Mich., assignor to Lear Siegler, Inc., Santa Monica, Calif.

Filed Dec. 18, 1975, Ser. No. 641,989
Int. Cl.[2] B60K *26/02*
U.S. Cl. 180—98 **7 Claims**



1. In a vehicle having a front end, back end and opposite sides, and which is driven in a back to front direction automatically along a preselected path, and which includes first switch means for arresting the movement of the vehicle along the path and a second switch means for restarting the vehicle along the path, the improvement which comprises:

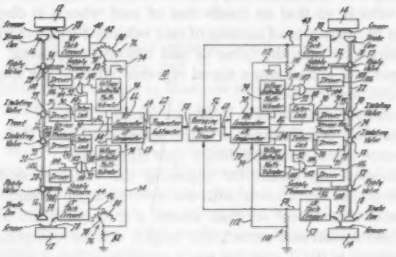
said first switch means comprising a manually operable elongated switch element extending substantially the length of a side of the vehicle, said switch element having contacts which close said first switch means when pressure is applied to any portion of said switch element; the elongated switch element extending substantially horizontally along a top portion of the side of the vehicle; said elongated element protrudes from a plane of the side of the vehicle; and the second switch means comprising a second manually operable elongated switch element which closes when manual pressure is applied thereto at any point along its length, the second elongated switch being positioned alongside the first switch element means elongated switch element and extending substantially the length of a side of the vehicle.

4,042,059

ANTI-SPIN CONTROL SYSTEM

Robert B. Bertolasi, Rockford, Ill., assignor to Kelsey-Hayes Company, Romulus, Mich.

Continuation-in-part of Ser. No. 362,334, May 21, 1973, abandoned. This application July 14, 1975, Ser. No. 595,566
Int. Cl.[2] B60T *8/18, 8/24*
U.S. Cl. 180—103 R **28 Claims**



1. A spin control system for a steerable vehicle having first and second wheels which are driven at least under predetermined conditions and are steerable through varying angles of steering and which are disposed on laterally opposed sides of said vehicle so that an inside one of said wheels is disposed closer to the center of turning of said vehicle during steering in one direction than the other of said wheels comprising:

means for generating a signal representative of the speed of said inside wheel;

means for generating a reference signal;

compensating means for adjusting the value of said wheel speed signal in accordance with the steering angle of said inside steerable wheel so that, absent a spin condition at said inside steerable wheel, the output of said compensating means at the 0° steering angle position defines a first signal value and for turns in said one direction from a straight course, the value of the output signal from said compensating means is greater than said first signal value when the turning radius of said inside steerable wheel is less than the average turning radius of said vehicle, is equal to said first signal value when the turning radius of said inside steerable wheel is equal to the average turning radius of said vehicle, and is less than said first signal value when the turning radius of said inside steerable wheel is greater than the average turning radius of said vehicle; and

means for comparing said adjusted wheel speed signal and said reference signal for providing a spin signal.

7. A spin control system for a steerable vehicle having first and second wheels which are driven at least under predetermined conditions and are steerable through varying angles of steering and which are disposed on laterally opposed sides of said vehicle so that an inside one of said wheels is disposed closer to the center of turning of said vehicle during steering in one direction than the other of said wheels comprising:

means for generating a signal representative of the speed of said inside wheel;

means for generating a reference signal;

compensating means for adjusting the value of said reference

signal in accordance with the steering angle of said inside steerable wheel so that, absent a spin condition at said inside steerable wheel, the output of said compensating means at the 0° steering angle position defines a first signal value and for turns in said one direction from a straight course, the value of the output signal from said compensating means is less than said first signal value when the turning radius of said inside steerable wheel is less than the average turning radius of said vehicle, is equal to said first signal value when the turning radius of said inside steerable wheel is equal to the average turning radius of said vehicle, and is greater than said first signal value when the turning radius of said inside steerable wheel is greater than the average turning radius of said vehicle; and

means for comparing said wheel speed signal and said adjusted reference signal for providing a spin signal.

13. A spin control system for a steerable vehicle having first and second wheels which are driven at least under predetermined conditions and are steerable through varying angles of steering and which are disposed on laterally opposed sides of said vehicle so that an inside one of said wheels is disposed closer to the center of turning of said vehicle during steering in one direction than the other of said wheels comprising:

means for generating a signal representative of the speed of said inside wheel;

means for generating a reference signal;

means for comparing said wheel speed signal and said reference signal for providing a spin signal; and

compensating means for adjusting the value of said spin signal in accordance with the steering angle of said inside steerable wheel so that, absent a spin condition at said inside steerable wheel, the output of said compensating means at the 0° steering angle position defines a first signal value and for turns in said one direction from a straight course, the value of the output signal from said compensating means is greater than said first signal value when the turning radius of said inside steerable wheel is less than the average turning radius of said vehicle, is equal to said first signal value when the turning radius of said inside steerable wheel is equal to the average turning radius of said vehicle, and is less than said first signal value when the turning radius of said inside steerable wheel is greater than the average turning radius of said vehicle.

4,042,060

AIR-LIFT VEHICLES

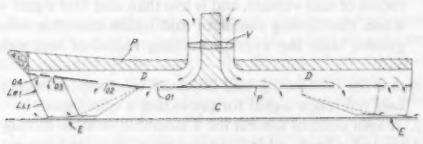
Jean Henri Bertin, Neuilly S. Seine; Paul Guienne, La Celle St. Cloud, and Andre Lafont, Paris, all of France, assignors to Bertin & Cie, Plaisir and Societe d'Etudes et de Developpement des Aeroglisseurs Marins, Terrestrea et Amphibies S.E.D.A.M., Paris, both of, France

Filed July 23, 1975, Ser. No. 598,530

Claims priority, application France, Aug. 5, 1974, 74.27139

Int. Cl.[2] B60V *1/16*

U.S. Cl. 180—127 **4 Claims**



1. An air lift vehicle comprising:

a platform,

an inner multilobed skirt depending from said platform and defining a central air cushion region,

an outer multilobed skirt surrounding said inner skirt, each lobe of said outer skirt being paired with one of the lobes of said inner skirt to define a crescent-shaped compartment between them, said crescent-shaped compartment being completely formed by said pair of lobes,

means carried by said platform for providing air under pressure to the central air cushion region and to the crescent-shaped compartments,

each of said lobes being formed by a blank of flexible material bent to define an arcuate central portion and substantially planar side portions, each two adjacent lobes of each skirt being arranged with their arcuate central portions substantially tangent to each other and their adjacent side portions in face-to-face contact,

the lower edge of the arcuate central portion of each outer skirt lobe being horizontal and arranged in the same horizontal plane as the lower edges of the arcuate central portions of all the other outer skirt lobes, and

the outer generatrix of each lobe forming an angle α with the vertical, re-entrant from top to bottom, the angle varying according to the location of the lobe on the vehicle and decreasing in magnitude from the front to the rear of the vehicle.

4,042,061

CELL-BOX-TYPE NOISE BARRIER HAVING LARGE MAGNITUDE OF TRANSMISSION LOSS AND NOISE INSULATING METHOD

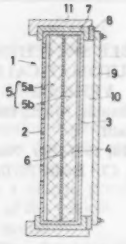
Norio Murakami, Kawasaki, Japan, assignor to Showa Koji K. K., Kawasaki, Japan

Filed Mar. 9, 1976, Ser. No. 665,230

Claims priority, application Japan, July 12, 1975, 50-84926

Int. Cl.[2] E04B *1/86;* **G10K** *11/04*

U.S. Cl. 181—33 HE **6 Claims**



1. A cell-box-type noise barrier having a large magnitude of transmission loss and comprising a plurality of single noise barrier structural units, each of said single noise barrier structural units consisting of (A) a hollow cell type block composed of a hollow cell-shaped box having a perforated sound-absorbing plate disposed on the side confronting the source of noise and a sound-insulating plate disposed on the opposite side relative to said perforated sound-absorbing plate and incorporating a sound-absorbing material to fill up the space therein and (B) a free-spacing plate disposed opposite said sound-insulating plate across a space and parallelly to said plate and connected with said sound-insulating plate by the medium of an elastic member so as to give rise to a free air layer between said free-spacing plate and said sound-insulating plate.

4,042,062

AIR PULSE NOISE DAMPER FOR A PNEUMATIC TOOL

Earl C. Tooley, Clayville, N.Y., assignor to Chicago Pneumatic Tool Company, New York, N.Y.

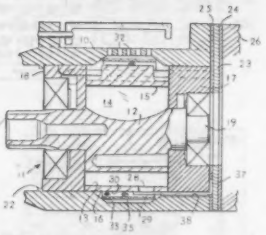
Filed Mar. 1, 1976, Ser. No. 662,373

Int. Cl.[2] F01N *1/20*

U.S. Cl. 181—36 A **13 Claims**

1. A pneumatic tool including an air driven motor comprising a rotor liner defining a rotor chamber having an air driven multiple vane rotor operable therein and having at least one exhaust port through the periphery of the liner for exhaust of

driving air from the rotor chamber; a housing for the tool encasing the motor; and a sound attenuating system through which the exhaust air passes to atmosphere, comprising: an annular chamber around the liner into which the exhaust port opens; a leaf spring flap damper disposed in the annular chamber in overlying relation to the exhaust port; and porting communicating the annular chamber to atmosphere; the damper being adapted to flex and oscillate relative to the exhaust port under pressure of air exhausting from the rotor chamber through the exhaust port into the annular chamber.

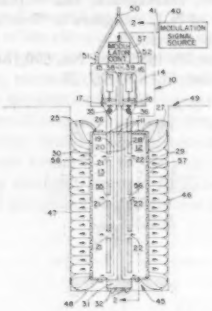


4,042,063

AIR CUSHION SHEAR WAVE VIBRATOR

Kenneth H. Waters, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed Oct. 10, 1975, Ser. No. 621,440
Int. Cl.² G01V 1/14
U.S. Cl. 181—119 **5 Claims**



3. A method of generating a seismic shear wave in a trench having two side walls comprising:

generating a steady state pressure against said side walls and modulating said steady state pressure against said side walls by simultaneously increasing said pressure on one of said walls and correspondingly decreasing said steady state pressure on said remaining side wall

whereby pressure variations will be applied to said walls simultaneously and in phase opposition to each other.

4,042,064

PLATFORM STRUCTURE

George W. Lobb, 110 N. Shaver, Pasadena, Tex. 77506

Filed Feb. 13, 1976, Ser. No. 657,756
Int. Cl.² E06C 7/16
U.S. Cl. 182—115 **1 Claim**

1. A platform structure adapted for rapid assembly and disassembly over a platform foundation, comprising:

a plurality of prefabricated column assemblies;

column mounting means for removably mounting said column assemblies on a platform foundation;

prefabricated landing assembly means mountable with said column assemblies for forming a landing above said column assemblies;

landing assembly mounting means for removably mounting said landing assembly means with said column foundation and wherein said landing assembly means includes a plurality of landing assemblies, each mountable with a selected pair of column assemblies;

said column assemblies include upright members;

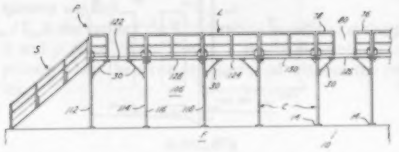
said landing assembly mounting means includes:

means for mounting at least one of said landing assemblies with the ends of said landing assembly extending substantially over said upright members of a pair of said column assemblies; and

means for mounting at least one of said landing assemblies with the ends of said landing assembly extending substantially to but not over the ends of said upright members of a pair of said column assemblies;

a prefabricated stair assembly mountable between said landing assembly means and the platform foundation; and

stair mounting means for removably mounting said stair assembly between said landing assembly means and the platform foundation.

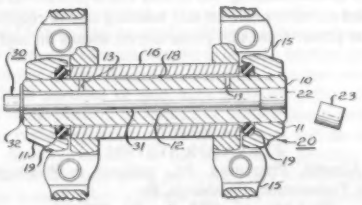


4,042,065

TRACK LINK HINGE JOINT LUBRICATING SYSTEM

Robert L. Crum, Springfield, Ill., assignor to Fiat-Allis Construction Machinery, Inc., Deerfield, Ill.

Filed Dec. 12, 1975, Ser. No. 640,255
Int. Cl.² F01M 1/00
U.S. Cl. 184—1 E **11 Claims**



1. In a track hinge joint wherein track links are joined one to the other by means of track pins secured to one track link and passing through a track link bushing carried by an adjacent track link to pivotally connect one track link to the other the improvement comprising

a lubricant retaining bore extending axially through said track pin,

aperture means extending through said track pin from said bore to the outer surface thereof adjacent said track link bushing, and

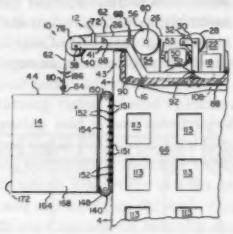
sealing means for closing the ends of said bore to retain lubricant therein,

said sealing means movable from a first sealing position adjacent an end of said track pin through said lubricant retaining bore formed therein to a second sealing position adjacent an opposite end of said track pin.

4,042,066
PORTABLE EMERGENCY FIRE FIGHTING AND RESCUE ELEVATOR

Martin J. Noone, 19 Hunting St., Cambridge, Mass. 02141

Filed Dec. 31, 1975, Ser. No. 645,823
Int. Cl.[2] B66B 9/00
U.S. Cl. 187—6 15 Claims



1. In a portable emergency rescue and evacuation elevator suitable for a high rise building the combination of:

a. portable elevator prime mover means including elevator cable storage means with sufficient elevator cable to accomodate the height of the building; self contained motor power means operatively coupled to said elevator cable storage means for selectively holding in fixed stop position, for paying out, and winding in said elevator cable; and a base to which said elevator cable storage means and self contained motor power means are mounted to form a portable unitary structure transportable by helicopter to the roof of said high rise building and for positioning to pay out said elevator cable over the side of said building; and

b. a portable elevator passenger cab transportable by truck to said building, said passenger cab having a wall between two caterpillar means each having an endless belt carried on a plurality of support wheels, fastening means for suspending said passenger cab on said elevator cable in position with the endless belts of said caterpillar means touching the side of said building, and a door in said passenger cab wall between the two caterpillar means facing and alignable with windows at respective storey levels of said building side as said cab is moved vertically by said elevator cable on said building side in response to motor power from said prime mover means on said roof.

4,042,067
ELEVATOR SYSTEM

Alan F. Mandel, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 16, 1975, Ser. No. 578,303
Int. Cl.[2] B66B 1/16
U.S. Cl. 187—29 R 16 Claims

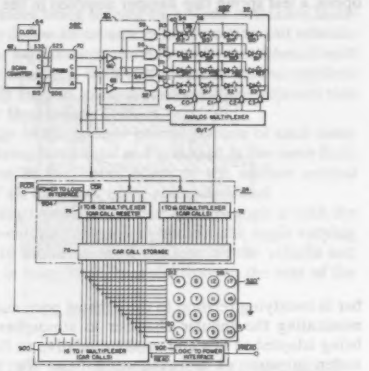
1. An elevator system, comprising:

an elevator car mounted for movement in a building to serve the floors therein,

call entry means disposed in said elevator car, said call entry means including a plurality of switches, notation means identifying the floor each switch is associated with, and means for operating each switch to register a call, p1 selector means for addressing a selected switch of said plurality to detect the operation thereof,

counter means for providing a continuously changing count value, and

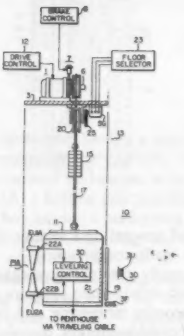
memory means programmed to provide predetermmined switch addresses for said selector means in response to predetermined count values of said counter means, with the predetermined switch addresses being provided by said memory means in a sequence which directs said selector means to monitor the switches in the order selected by said notation means.



4,042,068
ELEVATOR SYSTEM

William M. Ostrander, Hackensack, and William J. Casper, Mountainside, both of N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 25, 1975, Ser. No. 590,164
Int. Cl.[2] B66B 1/28
U.S. Cl. 187—29 R 8 Claims



1. A traction elevator system in which the time required to start a motor driven elevator car stopped at a floor with its door open and brake set is reduced, and the start away from the floor when the elevator car makes a run is smooth notwithstanding an unbalanced load, comprising:

means closing the door of the elevator car preparatory to a run,

means monitoring the position of the elevator car relative to the floor while the door is closing,

means releasing the brake before the door reaches the closed position,

means correcting for unbalanced load when the brake is released to hold the elevator car at floor level,

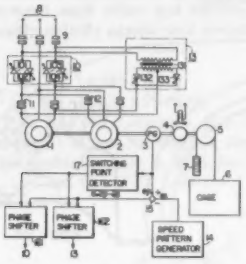
and means starting the elevator car away from the floor when the door reaches the closed position.

4,042,069

AC ELEVATOR CONTROL SYSTEM

Takeshi Ohira, and Akinori Watanabe, both of Katsuta, Japan, assignors to Hitachi, Ltd., Japan

Filed Mar. 4, 1975, Ser. No. 555,184
Claims priority, application Japan, Mar. 8, 1974, 49-26366
Int. Cl.[2] B66B *1/32*
U.S. Cl. 187—29 R 17 Claims



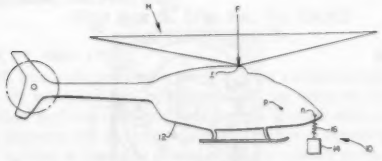
1. In an ac elevator which is provided with a multi-speed induction motor until connected to a three-phase ac power source and including a high-speed induction motor having a relatively high synchronous speed and a low-speed induction motor having a relatively low synchronous speed, and means for starting and accelerating said elevator car by means of a high-speed induction motor, a control system comprising regeneration braking means for imparting a regenerative braking torque to said low-speed induction motor by application of ac voltage thereto from said ac power source so as to reduce the moving speed of the elevator car, additional braking means for imparting another type of braking torque to the elevator car driving system, means for detecting a predetermined switching point between impartation of said regenerative braking torque and impartation of said other braking torque occurring before said regenerative braking torque becomes ineffective, and switching means responsive to the output of said switching point detecting means for deenergizing said regenerative braking means and energizing said additional braking means.

4,042,070

REMOTE RESONATOR APPARATUS AND METHOD

William George Flannelly, South Windsor, Conn., assignor to Kaman Aerospace Corporation, Bloomfield, Conn.

Continuation-in-part of Ser. No. 606,701, Aug. 21, 1975, abandoned. This application June 21, 1976, Ser. No. 698,094
Int. Cl.[2] F16F *7/10*
U.S. Cl. 188—1 B 10 Claims



1. In combination with a structure which is excited by a vibratory force at a characteristic forcing frequency ω_f, the improvement comprising:

a resonator attached to the structure at a point n remote from a point p on the structure and tuned to produce an antiresonance at the point p in accordance with the expression:

$$\Omega_r^2 = \frac{\omega_f^2}{1 + m_r(\dot{Y}_{nn} - \dot{Y}_{np}\left(\frac{\dot{Y}_{nr}}{\dot{Y}_{pr}}\right))}$$

where:

Ω_r is the tuned frequency of the resonator;

m_r is the mass characteristic of the resonator;

Y_{nn} and Y_{np} are the acceleration mobilities of the structure without the resonator at the characteristic forcing frequency ω_f; and

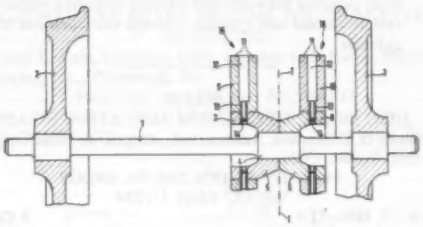
Y_{nr}/Y_{pr} is the ratio of the acceleration mobilities at the points n and p respectively due to a single disturbing force at point r when the structure is excited without the resonator.

4,042,071

WHEEL AND AXLE ASSEMBLY FOR RAILWAY VEHICLES HAVING DISC BRAKES

Hans Pöllinger, Munich, Germany, assignor to Knorr-Bremse GmbH, Munich, Germany

Continuation of Ser. No. 606,599, Aug. 21, 1975, abandoned. This application Jan. 12, 1977, Ser. No. 758,762
Claims priority, application Germany, Apr. 3, 1975, 2514597
Int. Cl.[2] B60T *1/06*
U.S. Cl. 188—18 A 5 Claims



1. In a wheel and axle assembly for railway vehicles, a pair of brake discs on an axle, each brake disc comprising a separate hub having end faces and a force-fitted portion on the axle, each said hub having an axially offset annular portion radially spaced from and surrounding the axle and a friction disc member mounted on said spaced annular portion so that each of said force-fitted portions of said hubs is axially offset from the central radial plane of its respective friction disc member such that any radial expansion of said fricton discs will not be transmitted directly, radially to the force-fitted portions of said hubs, said brake discs being juxtaposed in a mirror-image relationship to each other with the end faces of the separate hubs axially remote from the respective friction disc members being substantially in contact with each other.

4,042,072

PISTON-CYLINDER UNIT FOR USE IN A DISC BRAKE ASSEMBLY

Takashi Baba, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Oct. 7, 1975, Ser. No. 620,266
Claims priority, application Japan, Mar. 28, 1975, 50-36901
Int. Cl.[2] F16D *55/12, 65/74*
U.S. Cl. 188—71.8 18 Claims

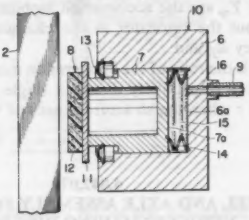
1. A piston-cylinder unit comprising:

a. a cylinder having one open end and one closed end;

b. a hydraulically actuated piston received in said cylinder for axial movement therein and having a piston head facing said closed end of said cylinder, and wherein an

outer surface of said piston slidably engages an inner surface of said cylinder;

c. a single flexible seal and biasing member having a first end fixedly attached in sealing engagement to said piston head and a second end fixedly attached in sealing engagement to said closed end of said clyinder axially opposed to said piston head for elastic expansion and contraction in an axial direction, said flexible seal and biasing member biasing said piston to a predetermined initial axial position and



defining therein between said piston head and said closed end of said cylinder a chamber for receiving fluid pressure for actuation of said piston to thereby move said piston axially toward said open end of said cylinder; and

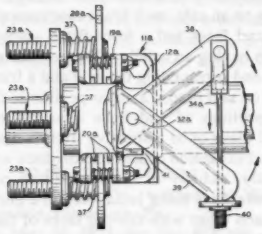
d. flexible means interconnecting said piston and said cylinder by fixed connection at said open end of said cylinder for preventing particles such as dust and water droplets from entering between said slidably engaging surfaces of said piston and said cylinder through said open end of said cylinder.

4,042,073

DISC BRAKE MECHANISM ACTUATING MEANS

William D. Dickenson, Auburn, Ind., assignor to Dana Corporation, Toledo, Ohio

Filed May 27, 1976, Ser. No. 690,427
Int. Cl.² F16D *55/224*
U.S. Cl. 188—72.9 **3 Claims**



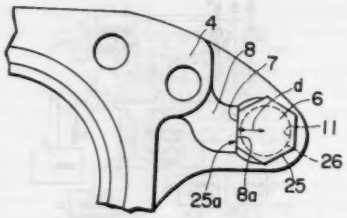
1. A disc mechanism having a pair of brake plates with brake pads that are carried by a caliper mechanism that is mounted on an axle housing comprising: in combination, a rotor adapted for rotation with the end of an axle external of the axle housing, a portion of the periphery of said rotor extending between the brake pads; spring means for urging the brake plates apart; means for actuating the caliper mechanism for axially squeezing the pads against said rotor, said actuating means including a pair of actuating levers that are pivotally mounted on a caliper mechanism bracket, the inner end of each of said levers being engaged with the inner one of the brake plates, the outer end of one of said levers being attached to an actuating cable and the outer end of the other one of said levers being attached to a sheath of said cable and stop means on the caliper mechanism bracket for preventing the movement of said other lever in the direction of movement of said cable when said cable is actuated.

4,042,074

PIN CONNECTION FOR A FLOATING TYPE DISC BRAKE

Yosuke Ishihara, Itami, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed July 30, 1976, Ser. No. 710,046
Claims priority, application Japan, Aug. 5, 1975, 50-108950[U]; Apr. 3, 1976, 51-41021[U]
Int. Cl.² F16D *55/224*
U.S. Cl. 188—73.3 **2 Claims**



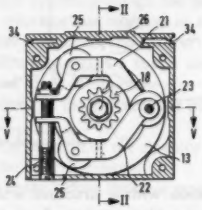
1. In a floating disc brake of the type having, a fixed member, inner and outer pads slidably guided by said fixed member into and out of pressing contact with opposite faces, respectively, of a disc to be braked, a caliper member spanning said disc and both said pads, one of said pads being mounted on one end of said caliper, piston means for acting between the other pad and the other end of said caliper member, and guide pins slidably connecting said caliper member to said fixed member, each said guide pin having a head portion secured to said caliper member and a shaft portion extending axially of said disc along said caliper in a direction away from the point at which said head portion is secured to said caliper member for sliding within a receiving opening in said fixed member, the improvement characterized by each said head portion and said caliper member in the vicinity of said head portion being matingly shaped to fit said head portion to said caliper member to prevent rotation of said guide pin, each said head portion comprising a part having a polygonal periphery with a plurality of side faces, one of said head side faces being closer to the center line of said guide pin than all the other side faces, said caliper member in the vicinity of each said head portion having a protrusion with a flat side face abutting the said one head side face to prevent rotation of said guide pin.

4,042,075

MOUNTING AND BRAKE ASSEMBLY FOR ROLLER BLIND

Klaus Hehl, Remscheid-Luttringhausen, Germany, assignor to Riloga-Werk Julius Schmidt, Remscheid-Luttringhausen, Germany

Filed July 15, 1976, Ser. No. 705,384
Claims priority, application Germany, July 17, 1975, 2531864
Int. Cl.² F16D *49/00*
U.S. Cl. 188—75 **10 Claims**



1. A mounting assembly for a roller blind, said assembly comprising a housing; a shaft rotatable on said housing about an axis and adapted to carry a roller blind; a drive wheel fixed

on said shaft and rotatable in said housing about said axis by means of a flexible member; a friction-type brake wheel in said housing fixed on said shaft and jointly rotatable with and spaced from said drive wheel about said axis and having a periphery; a pair of levers in said housing each having one end pivoted on the one end of the other lever and each also having another end; a roller carried on each of said levers intermediate its ends and directly bearing radially continuously on said periphery; and means between the other ends of said levers for pulling same toward each other and thereby pressing said rollers continuously radially against said periphery.

4,042,076

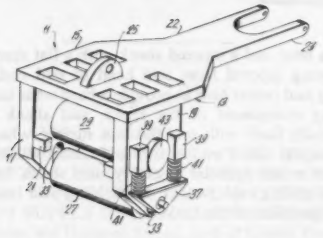
BRAKING SYSTEM

Charles Citelli, P.O. Box 162, Lexington, N.Y. 12452

Continuation-in-part of Ser. No. 649,563, Jan. 15, 1976, abandoned. This application Dec. 6, 1976, Ser. No. 747,794

Int. Cl.[2] B60T *1/04*

U.S. Cl. 188—80 **11 Claims**



1. A braking system for a vehicle mounted on wheels comprising:

a first roller;

a second roller;

a housing means, said second roller being rotatably mounted in said housing means and said first roller being both rotatably and slidably mounted in said housing means to move to and from said second roller;

resilient means mounted on said housing means for forcing said first roller away from said second roller;

brake means operatively associated with said second roller for retarding the rotation of said second roller;

means for mounting said housing means on a vehicle; and

pressure means for frictionally engaging said first roller with a wheel mounted on the vehicle and for further forcing said first roller against said wheel so as to overcome the force of the resilient means and for frictionally engaging the first roller with the second roller.

4,042,077

CALIPER DISC BRAKE OR THE LIKE

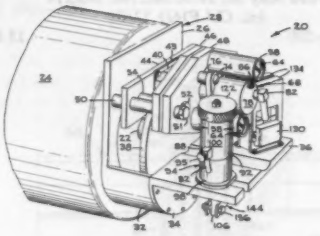
Richard H. McCarthy, West Allis, Wis., assignor to FMC Corporation, San Jose, Calif.

Filed July 28, 1976, Ser. No. 709,555

Int. Cl.[2] B60T *13/04*

U.S. Cl. 188—171 **10 Claims**

10. In a brake system or the like, wear compensating apparatus for maintaining a predetermined gap between the planar friction surfaces of relatively movable friction elements when the elements are in their released positions comprising; means for moving at least one of said elements relative to the other in a direction parallel to said planar surfaces; pressure applying means for normally urging said friction elements into engagement with each other for terminating said parallel relative movement between said friction elements, hydraulic piston and cylinder means operatively connected to said friction elements for overcoming said pressure applying means and moving said elements through said predetermined gap to said released position, said piston and cylinder means having a headspace which gradually reduces in volume in response to wear of said friction elements, means for directing a predetermined volume of hydraulic fluid into said hydraulic piston and cylinder means during each movement of said friction element to said released position, and reservoir means for receiving any excess hydraulic fluid from said diminishing headspace that is due to frictional wear of said elements prior to moving the elements to their released positions, piston means in said reservoir, and means urging said piston means against the hydraulic fluid in said reservoir thereby permitting said reservoir to be positioned in a plurality of different attitudes.



4,042,078

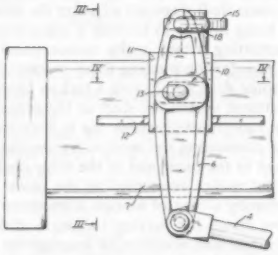
RAILWAY CAR BRAKE RIGGING FULCRUM LEVER MOUNTING

Roland E. Cale, Cortland, Ohio, assignor to Schaefer Manufacturing, Inc., Pittsburgh, Pa.

Filed Oct. 20, 1976, Ser. No. 734,037

Int. Cl.[2] B61H *13/38*

U.S. Cl. 188—231 **6 Claims**

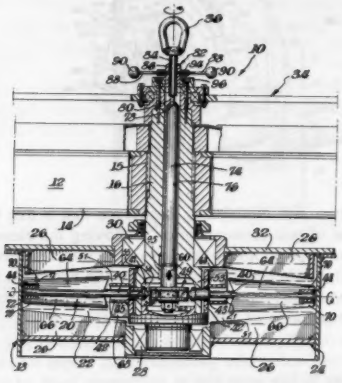


1. The combination with a railway car body having a center sill and supported by a truck provided with wheels mounted on a pair of axles, a live brake lever between the axles having upper and lower ends, a link pivotally connected at one end to the upper end of said lever and extending across the top of the adjacent axle, a substantially vertical fulcrum lever having a lower end pivotally connected to the opposite end of said link and having a circular opening through its central portion, the wall of said opening being convex from side to side of the fulcrum lever and forming an arc of a circle, and a rigid supporting member for the fulcrum lever projecting laterally from one side of said sill and having a hook at its outer end extending through said fulcrum lever opening and curved away from said live lever, said hook forming an arc of a circle and having a circular cross section, the radius of the inside of the hook being substantially the same as the radius of said wall arc, the inside diameter of said fulcrum lever opening being only slightly greater than the diameter of the hook in cross section, and the upper end of the fulcrum lever being formed for connection to means for rocking said fulcrum lever around said hook.

4,042,079
VARIABLE ENERGY ABSORBER FOR AIRCRAFT ARRESTING SYSTEM

Donald B. Doolittle, Hockessin, and Harry W. Deshay, Rambleton Acres, both of Del., assignors to All American Industries, Inc., Wilmington, Del.

Filed May 30, 1975, Ser. No. 582,214
Int. Cl.[2] F16D 57/02
U.S. Cl. 188—290 13 Claims



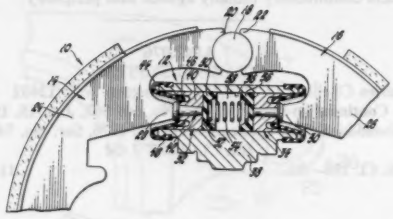
1. A rotary fluid-operated energy absorbing device comprising a casing for containing a fluid, a rotor shaft having an outer end disposed outside the casing and an inner portion disposed within the casing, bearing means rotatably mounting the inner portion of the rotor shaft inside the casing, a rotary input driving means connected to the outer end of the rotor shaft, a plurality of axle and bearing assemblies connected at right angles to the rotor shaft inside the casing, a pair of rotor vanes secured to each of the axles, on opposite sides thereof, the portion of the rotor shaft disposed adjacent the axle and bearing assemblies being hollow to provide a compartment within it, motion transmitting means in the compartment and being connected to the axles for rotating them to vary the angle of the vanes, the rotor shaft also having a hollow center connecting the compartment within the shaft to the outer end of the shaft, a control rod disposed within the hollow center of the rotor shaft and connecting the motion-transmitting means in the compartment to the outer end of the rotor shaft, and control motion input means connected to the outer end of the control rod whereby a control motion is imparted to the motion-transmitting means for varying the angle of the vanes to their path of motion and accordingly varying the energy absorbed, the axle and bearing assemblies comprising a radial array of axles rotatably disposed within a radial array of inner and outer bearings, the inner axle bearings are disposed in a perforated wall in the rotor shaft at the compartment within it, the plurality of axle and bearing assemblies being secured together by segmented plates and the vanes on each of the axles being disposed on opposite sides of the segmented plates, the vanes on the same axle being substantially parallel and out of line with each other whereby the vanes on each axle are always disposed on the opposite sides of the segmented plates and may lie in one orientation thereof substantially contiguous to opposite sides of the segmented plates.

4,042,080
WHEEL CYLINDER PISTON CONSTRUCTION

Richard P. Nelson, Bellbrook, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed May 19, 1976, Ser. No. 688,047
Int. Cl.[2] F16D 65/24
U.S. Cl. 188—361 1 Claim

1. A piston assembly for use in a hydraulic wheel cylinder assembly for a brake, said piston assembly having a powdered metal piston body preformed as a skirted cylinder with a flat end surface on one end and an annular depression on the other end and a passage extending axially therethrough and through said flat end surface, said annular depression having side walls, said flat end surface being adapted to engage and axially support a cup seal, the side walls of the annular depression defining the cylinder skirt interior wall and the outer wall of a center boss which surrounds the passage; and a hardened insert

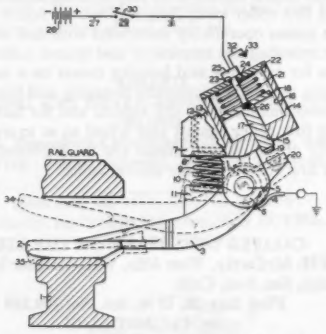


having a head and a tapered shank with a flat shank end, said shank being tapered from said head to said end, said head covering said center boss to provide a hard wear surface for an operating component of the brake, said shank end fitting substantially flush with said flat end surface whereby no air pocket at the shank end is formed which will trap air in a hydraulic wheel cylinder assembly, said shank fitting tightly into and sealing said passage for holding said insert in place during operation of the brake.

4,042,081
MANUAL CONTROL OF THIRD RAIL POWER KNOCKOUT

Jerome R. Pier, Bonita, Calif., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed Oct. 24, 1975, Ser. No. 625,482
Int. Cl.[2] B60L 3/04, 5/38
U.S. Cl. 191—8 6 Claims



1. Power knockout apparatus for disposition in a power-supply circuit extending from a third rail power supply to at least one electrically-operated prime mover of an electrically-propelled vehicle, said power knockout apparatus comprising in combination with the third rail and the power-supply circuit:

a. current-collecting means for current-collecting engagement with the third rail,
b. a fulcrum member,
c. a lever pivoted intermediate its ends on and in insulated relation with said fulcrum member, said lever carrying said current-collecting means at one end thereof and hav-

ing an electrical connection with the power supply circuit for the at least one electrically-operated prime mover,

d. biasing means for transmitting a force to said lever to cause rocking thereof about said fulcrum member in one direction to force said current-collecting means into current-collecting engagement with the third rail,

e. means for causing rocking of said lever in a direction opposite said one direction to effect the lifting of said current-collecting means out of current-collecting engagement with the third rail,

f. potentially-explosive means normally effective to render said means ineffective to rock said lever in the direction opposite said one direction, and

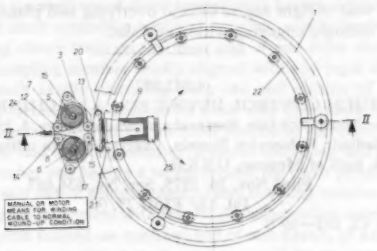
g. manually-controlled electrically-operated means for effecting the explosion of said potentially-explosive means whereupon said rocking means is rendered effective to rock said lever in the direction to lift the current-collecting means out of current-collecting engagement with the third rail.

4,042,082

DEVICE FOR RECEIVING, FROM A FIXED ELECTRIC CONNECTION, ADAPTING TO LENGTH, AND HOLDING CONDUCTORS FOR THE ELECTRIC CURRENT SUPPLY OF MOVABLE CONSUMERS

Otto E. Hellmiss, and Heinrich Simon, both of Kassel, Germany, assignors to RHEINSTAHL Aktiengesellschaft, Essen, Germany

Filed Dec. 11, 1975, Ser. No. 639,870
Claims priority, application Germany, Dec. 12, 1974, 2458758
Int. Cl.[2] H02G *11/02*
U.S. Cl. 191—12.2 A **6 Claims**



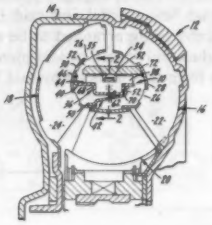
1. A device for receiving electric conductors from a fixed electric connection, adapting said conductors to length and holding the same for the electric current supply of movable consumers, which includes in combination: at least one spool box having at least one rotatably and exchangeably mounted winding storage mandrel associated with said spool box, said mandrel also being provided with means for passing said electric conductor in the form of a cable therethrough, winding-up means associated with said mandrel for winding up said cable, a consumer connection provided with entraining means forming a movable cable carrier, a guiding path for guiding said carrier along said guiding path, said spool box being provided with a plurality of guiding rollers for said cable, and the entraining means having guiding strips bent off at the ends thereof, and a roller path arranged outside said spool box and said entraining means for simultaneously guiding and holding the cable sections between the fixed electric connection and the spool box and between the latter and said entraining means.

4,042,083

TORQUE CONVERTOR WITH CENTRIFUGAL LOCK UP CLUTCH

Willis Lorenz Schulz, Utica, Mich., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Dec. 1, 1975, Ser. No. 636,518
Int. Cl.[2] F16H *45/02*
U.S. Cl. 192—3.31 **3 Claims**



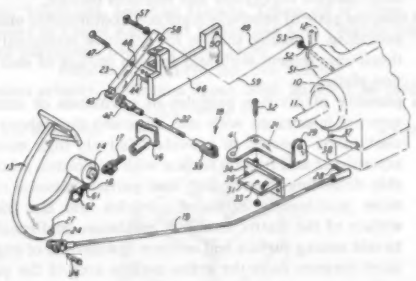
1. In a hydrodynamic device having a fluid impeller and a turbine with a space therebetween, a clutch mechanism in said space comprising a first annular clutch member connected to said impeller and having a clutch surface thereon, a second clutch member comprising an annular ring secured to the turbine having a plurality of ramp areas formed therein having ramp surfaces formed from the material of the ring thereon, friction means mounted in said ramp areas and in contact with and supported by said ramp surfaces between said ramp surfaces and said clutch surface, centrifugal force acting to urge said friction means into engagement with said clutch surface at a given speed of rotation to lock said elements together, said ramp surfaces acting after initial engagement of said devices to wedge said devices between said first and second clutch members, said second clutch member comprises an annular sheet metal continuous ring having said ramp areas and surfaces formed therein.

4,042,084

VEHICLE CLUTCH CONTROL ASSEMBLY

John Carl Schulz, Burlington, Iowa, assignor to J. I. Case Company, Racine, Wis.

Filed Apr. 15, 1976, Ser. No. 677,282
Int. Cl.[2] B60K *41/24, 41/26;* F16D *67/02;* F16H *57/10*
U.S. Cl. 192—13 R **3 Claims**



1. A vehicle clutch control assembly for use with a hydraulic transmission, comprising a fluid valve with an axially movable plunger axially positionable between a clutch engaged position and a clutch disengaged position and an intervening clutch neutral position, a spring operatively associated with said plunger for yieldingly urging said plunger to the clutch disengaged position, a brake pedal, linkage connected to said brake pedal, a lever connected with said linkage and having a portion engagable with said plunger and axially urging said plunger

against the urging of said spring and thus to the clutch engaged position, and said lever portion being operatively associatable with said plunger for allowing movement of said plunger from the clutch engaged position and through the clutch neutral position and to the clutch disengaged position, and a lock-out assembly selectively operatively associatable with said plunger and separately from any interconnection with said linkage and including a portion abuttable on said plunger for restraining said plunger in the clutch engaged position irrespective of the position of said brake pedal and said linkage, said lock-out assembly thereby being arranged to be associatable with said plunger to induce movement of said plunger in the axial direction opposite from that induced by said linkage.

4,042,085

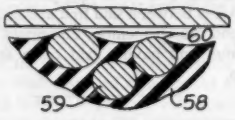
FRICTION COUPLING

Roger O. Bjerk, Edelstein; William D. Brandon; Frederick S. Engleking, both of Peoria, and John P. Jero, Washington, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 544,148, Jan. 27, 1975, abandoned, which is a continuation-in-part of Ser. No. 366,967, June 4, 1973, Pat. No. 3,898,361. This application May 10, 1976, Ser. No. 684,816

Int. Cl.² F16D *13/60, 69/02*

U.S. Cl. 192—57 **9 Claims**



1. A friction coupling comprising:

a rotatable friction plate formed of a martrix of a relatively soft elastomeric material providing a friction surface and selected from the group of elastomeric materials consisting of polyacrylate, silicone, fluorosilicone, chloroprene, acrylonitrile, urethane, and hexafluoropropylene-vinylidene fluoride copolymer and mixtures thereof;

a reaction plate of relatively rigid non-compressible material providing a mating surface for selective rotational frictional engagement with said friction surface of said friction plate;

a plurality of discrete particles of a vitreous or ceramic material intermixed with and dispersed throughout said elastomeric material to provide relatively high modulus asperities in said friction surface with said matrix reboundably deflecting to permit at least partial recession of the more prominently extended particles into the friction surface of the matrix to ensure maximum conformability to said mating surface and uniform distribution of engagement pressure over the entire surface area of the plates; and

a supply of fluid provided between said plates with the fluid hydrodynamically wedging between the asperities and the mating surface of the reaction plate during relative rotation of the plates for developing and sustaining a film of separating fluid over the asperities that produces a viscous drag upon the friction plate so as to cause substantially all of the energy of plate engagement to be absorbed in shear of said fluid film until just prior to complete engagement of the plates.

4,042,086

APPARATUS FOR CONNECTING A CLUTCH RELEASE BEARING TO A CLUTCH RELEASE ACTUATING ELEMENT

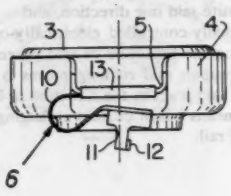
Horst M. Ernst, Eltingshausen; Manfred Brandenstein, Aschfel, and Armin Olschewski, Schweinfurt, both of Germany, assignors to SKF Industrial Trading and Development Company B.V., Amsterdam, Netherlands

Continuation of Ser. No. 508,088, Sept. 23, 1974, abandoned. This application Sept. 20, 1976, Ser. No. 725,149

Claims priority, application Germany, Oct. 2, 1972, 7335937

Int. Cl.² F16D *19/00*

U.S. Cl. 192—98 **3 Claims**



1. In a clutch release bearing having an outer cap provided with at least one extending lug adapted to engage a clutch release actuating element comprising a hook-like end having a curved outer edge and a slot opening along an inner edge, a connecting element comprising a flat spring member having a shank at one end adapted to be connected to said lug and a shank at the other end having a planar surface forming a rest plate for slidably engaging said curved outer edge, said spring being bent between said end shanks in an unstressed condition wherein said shanks lie at an acute angle to each other and which may thereafter be bent so that said shanks substantially overlie each other when connected to said lug and when slidingly engaging said clutch release actuating element so as to be in stressed condition, said spring being further formed with a perpendicular wall integral with said planar surface forming said rest plate along one side thereof and a web extending from said wall at right angles thereto overlying said planar surface and slidingly engaging within said slot.

4,042,087

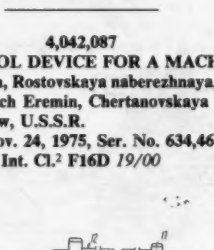
CLUTCH CONTROL DEVICE FOR A MACHINE TOOL

Artur Markovich Itin, Rostovskaya naberezhnaya, 1, kv. 47, and Vladimir Fedorovich Eremin, Chertanovskaya ulitsa, 66, kv. 24, both of Moscow, U.S.S.R.

Filed Nov. 24, 1975, Ser. No. 634,467

Int. Cl.² F16D *19/00*

U.S. Cl. 192—99 S **2 Claims**



1. A clutch control device for a machine tool, comprising a horizontal shaft; a handle secured to said shaft; a vertical shaft; the centerlines of said vertical and horizontal shafts extending

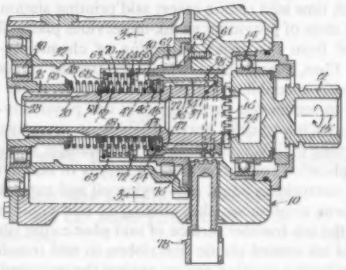
through the same plane; a 3D spherical Geneva mechanism interconnecting said two shafts; a driving member and a driven member of said Geneva mechanism secured to said horizontal and vertical shafts, respectively; said horizontal shaft having a drilled opening to accommodate the vertical shaft, said drilled opening receiving the outer race of a spherical sliding bearing, an inner race of said bearing being secured to said vertical shaft.

4,042,088

LOW SPEED DISCONNECT

James S. Schmohe, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Dec. 22, 1975, Ser. No. 643,253
Int. Cl.[2] F16D *13/60*
U.S. Cl. 192—114 R **12 Claims**



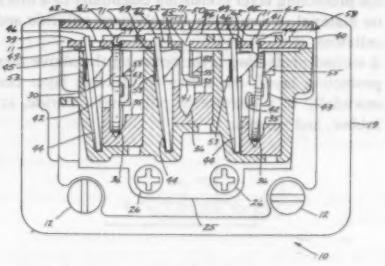
1. In a constant speed drive transmission having a housing, an input shaft extending into said housing, axially inwardly extending clutch teeth on the inner end of said input shaft, a splined coupling member axially aligned with said input shaft, clutch teeth axially extending from one end portion of said coupling member and adapted to mesh with said clutch teeth on said input shaft, a driven member splined to the other end portion of said coupling member, a sleeve encircling said coupling member and having a worm around the outer periphery thereof, said sleeve being splined to said coupling member for relative axial movement with respect to said coupling member, ratchet teeth formed on one axial end of said sleeve, an axially movable one-way detent teeth means carried by the housing and extending toward said ratchet teeth, means for resiliently urging said one-way detent teeth means toward said sleeve, first resilient means acting between said driven member and said sleeve to urge the sleeve toward the input shaft, means on the sleeve engaging the coupling member for urging said coupling member into coupled relationship with the input shaft, second resilient means acting between said coupling member and said sleeve for urging the coupling member away from the input shaft, and gear means movable into contact with said worm on said sleeve whereby the rotation of the input shaft and the coupling member will thread the worm along the coupling member away from the input shaft to positively disconnect the teeth on the coupling member from the teeth on the input shaft and will engage the ratchet teeth on the sleeve with the one-way detent teeth to permit the sleeve and coupling member to be moved axially away from the input shaft but prevent the sleeve from rotating reversely while the second resilient means prevents the coupling member from reengaging with said input shaft.

4,042,089

COIN SLIDE APPARATUS

John C. Mellinger, Newton, Iowa, assignor to The Maytag Company, Newton, Iowa

Filed July 9, 1976, Ser. No. 703,929
Int. Cl.[2] G07F *3/02*
U.S. Cl. 194—102 **15 Claims**



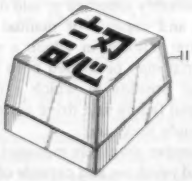
1. A coin slide apparatus for initiating the operation of a machine with a predetermined combination of coins supported substantially on edge, comprising: slide support means for mounting said coin slide apparatus to said machine including a faceplate and a slide housing defining a coin slide guideway extending through said faceplate; coin receiver means supported in said slide housing and defining a plurality of longitudinal grooves and a plurality of coin slots for receiving said coins and upon manual actuation for moving said coins from a coin receiving position to a coin measuring position; coin measuring means associated with each of said grooves and including a gaging block for supporting the lower edge of said coin and a shoulder spaced a predetermined distance above said gaging block and engageable by the face of said coin at the upper edge thereof; a coin sensing lever adjacent said groove at said coin measuring position and biased against said coin on the side opposite said shoulder and having a first posture with a proper sized coin engaging said shoulder and movable to a second posture with an undersized coin in said groove; and stop means engageable by said coin sensing lever in said second posture to prevent the advancement of said coin slide assembly from said coin measuring position to an actuating position.

4,042,090

KEY TOP

Sadao Hasebe, Tokyo; Hiromitsu Ono, Ichikawa; Minoru Murata, Yokohama, and Yuji Harada, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha and K.K. Chiyoda Gurabiya Insatsusha, both of Tokyo, Japan

Filed Sept. 17, 1974, Ser. No. 506,871
Claims priority, application Japan, Sept. 20, 1973, 48-106275
Int. Cl.[2] B41J *5/12*
U.S. Cl. 197—102 **1 Claim**



1. A key top which comprises:

i. a key top base composed of an integrally formed ABS resin having a side portion and a top portion,

ii. a colored portion in the form of a sign provided on the top portion of the key top base, the colored portion consisting

essentially of a mixture of polyvinyl chloride, polymethyl methacrylate and a colorant,

iii. an adhering layer provided between the top portion of the key top base and the colored portion, the adhering layer consisting essentially of a mixture of styreen resin and synthetic rubber,

iv. a protecting layer covering at least the colored portion, the protecting layer consisting essentially of a thermoplastic material of a mixture of polyvinyl chloride and nitrocellulose, and

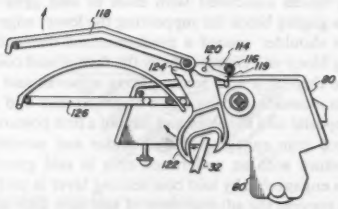
v. a second protecting layer covering the above mentioned protecting layer, the second protecting layer consisting essentially of a mixture of polyvinyl chloride, synthetic rubber, and silicon.

4,042,091

RECORD MATERIAL FEED APPARATUS

Leo Levinson, Berkeley, and Andrew Wong, Fremont, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Mar. 25, 1976, Ser. No. 670,464
Int. Cl.² B41J *15/04*
U.S. Cl. 197—138 R **2 Claims**



1. Record material feed apparatus for use with a printing machine of the type including a platen, means for rotating the platen about its axis, at least one roller, a lever capable of manual movement between first and second positions, and means coupled between the lever and said at least one roller for maintaining the roller in engagement with the platen when the lever is in its first position and for maintaining the roller spaced a predetermined distance from the platen when the lever is in its second position, said feed apparatus comprising:

a drive assembly capable of engaging and, when enabled, feeding a marginally punched record material that is loaded thereon;

a guide rack pivotably mounted to said drive assembly about a pivot pin and capable of manual pivotal movement between a first position in which a marginally punched record material may be loaded onto said drive assembly and a second position in which a marginally punched record material fed by said drive assembly may be guided along said guide rack; and

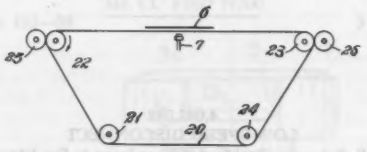
an interlock member pivotably mounted to said drive assembly about said pivot pin and capable of engaging said lever and being engaged by said guide rack when said feed apparatus is mounted to said printing machine for automatically moving said lever from its first position to its second position when said guide rack is manually pivoted from its first position to its second position, and for automatically returning said lever to its first position when said rack is manually returned to its first position.

4,042,092

DUPLICATING METHOD

Douglas A. Newman, Glen Cove, N.Y., assignor to Columbia Ribbon and Manufacturing Co., Inc., Glen Cove, N.Y.

Continuation-in-part of Ser. No. 302,186, Oct. 30, 1972, Pat. No. 3,937,178. This application July 28, 1975, Ser. No. 599,718
The portion of the term of this patent subsequent to Feb. 10, 1993, has been disclaimed.
Int. Cl.² B41J *31/14*
U.S. Cl. 197—171 **8 Claims**



1. Continuous duplicating method in which an inked ribbon is continuously moved into and out of a printing station into transfer position between a copy sheet and a printing member, ink being transferred from said ribbon to said copy sheet by means of energy applied to said ribbon by said printing member each time said ribbon enters said printing station, comprising the steps of providing an ink-impervious plastic film ribbon selected from the group consisting of chemically-oleophilic plastic films, plastic films which are treated to render them chemically-oleophilic and plastic films which are etched or coated to render one surface porous and physically-oleophilic having an ink-transfer surface which is receptive to liquid non-drying oil ink, contacting said ink-transfer surface with an ink-application roller containing a supply of liquid non-drying oil ink comprising liquid non-drying oil and pigment to apply a uniform, continuous, thin coating of said liquid non-drying ink to the ink-transfer surface of said plastic film ribbon, moving said ink-coated plastic film ribbon to said transfer position and applying a printing energy against the uncoated surface of said plastic film ribbon by means of said printing member to cause corresponding portions of said liquid ink coating to transfer to said copy sheet, moving said plastic film ribbon out of said transfer position, applying an additional amount of said liquid non-drying ink to the ink-transfer surface of said plastic film ribbon, at least in areas from which said ink has been transferred to said copy sheet, and reintroducing said ink-coated plastic film ribbon to transfer position in said printing station.

4,042,093

TEXTILE SLIVER CAN CHANGING AND STORAGE APPARATUS

Masakatsu Fujii, and Toshio Yasufuku, both of Ohgaki, Japan, assignors to Kabushikikaisha Hara Shokki Seisakusho, Japan

Filed July 8, 1976, Ser. No. 703,544
Claims priority, application Japan, July 17, 1975, 50-86703
Int. Cl.² B65G *25/10*
U.S. Cl. 198—339 **4 Claims**

1. A can doffing apparatus having;

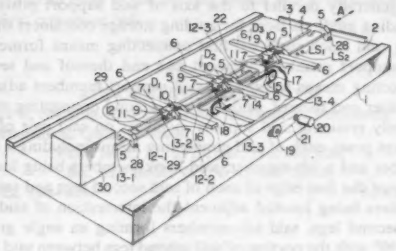
at least one series of a can filling station and one or more empty can ready stations spaced at regular intervals to sustain thereon respectively succeeding cans,

doffing means reciprocably disposed along the series of the stations to intermittently produce one cycle of reciprocation and having a series of pivoted arms identical in number and identically spaced with the series of stations,

means to swing the series of arms all simultaneously upright on retracting stroke of the reciprocation motion while keeping in horizontally swung down position on advancing stroke to thereby disengage from and engage the succeeding cans respectively on the retracting and advancing strokes,

said means to swing the series of arms comprising linear cam

extending along and fast to the series of stations and one cam follower member mounted on the doffing means for each arm to transmit the cam action from the cam to the corresponding arm, and



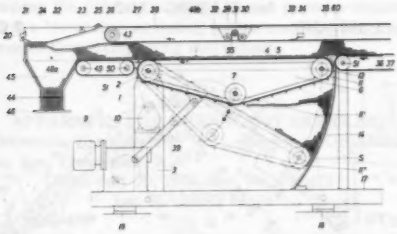
electrical driving means to intermittently cause the doffing means to perform the said one cycle of reciprocation rest periods of which are evenly spaced and of equal length.

4,042,094

CONVEYING AND STORING APPARATUS

Alfred Schmermund, Kornerstrasse 62, 5820 Gevelsberg, Germany

Filed May 24, 1976, Ser. No. 689,411
Int. Cl.[2] B65G *43/08*; C10B *31/04*
U.S. Cl. 198—347 **8 Claims**



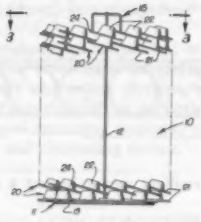
1. Conveying and storing apparatus for conveying articles between two machines and for storing articles in transit between the machines, comprising a conveyor to convey the articles in a conveying direction, the conveyor comprising a pivotable carrier member, two pulleys each of divided construction mounted on said carrier member respectively upstream and downstream in said conveying direction and rotatable about respective axes of rotation, a conveyor belt of divided construction extending around said pulleys, a plurality of article entraining elements each of divided construction and provided on said conveyor belt, said carrier member being pivotable about the axis of rotation of the downstream one of said pulleys and being disposed between divided portions of said pulleys, and store defining means to define with said conveyor a store for storing said articles, said store defining means comprising an arcuate wall element provided with a plurality of recesses receiving the divided portions of said entraining elements, said arcuate wall element being arranged adjacent to said conveyor belt at the upstream and of said conveyor and extending parallel to the path described by said upstream end of said conveyor under pivoting of said carrier member.

4,042,095

HIGH DENSITY MERCHANDISE DISPLAY AND RACK

George M. Sawyer, 8801 Calico Ave., Garden Grove, Calif. 92641

Filed Nov. 20, 1975, Ser. No. 633,863
Int. Cl.[2] A47F *7/00*
U.S. Cl. 211—49 D **1 Claim**



1. In a high density merchandise display,
   a. a base and a support rod extending upwardly from the base, and
   b. multiple display units for said merchandise fanning outwardly from and spaced circularly about the rod, the units having stacked relation,
   c. each unit including a sheet, and including an item of merchandise carried on the sheet, the sheet containing an opening through which the rod projects, the item of merchandise located radially outwardly of the opening, all of said items of merchandise standing generally vertically in the same direction outwardly of the sheets and forming circularly spaced columns which are inclined from vertical, the sheets being interleaved, each sheet having an edge extending adjacent the side of a container for an item of merchandise on another adjacent and interleaved sheet, said edge extending generally horizontally, circularly adjacent units having sheet overlap producing tilting of substantially all sheets from horizontal,
   d. each sheet comprising a card, and each item of merchandise being enclosed in one of said containers on the card, the container comprising a transparent receptacle standing outwardly from the plane of the card, the receptacles located closer to the edges of the cards remote from the support rod than to the edges closest to said rod,
   e. the base substantially flat and formed by means spaced outwardly from and extending about said axis, and adjacent which the lowermost cards extend substantially horizontally,
   f. the display formed by said units being substantially cylindrical in outline, throughout the height thereof.

4,042,096

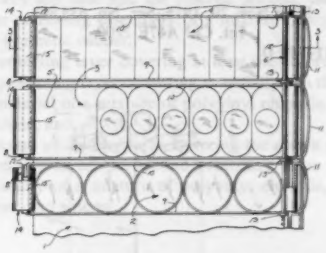
SHELF AID

Daniel F. Smith, 3278 N. 106th St., Milwaukee, Wis. 53222

Filed Mar. 15, 1976, Ser. No. 667,162
Int. Cl.[2] A47F *3/02*
U.S. Cl. 211—49 D **11 Claims**

1. A shelf aid for displaying merchandise and the like in a plurality of adjacent series upon a shelf with each series containing like objects arranged in alignment from front to back on the shelf, comprising in combination with a shelf and a series of objects thereon, means including a pusher member at the rear of the series and tensioned side members extending forwardly therefrom separately encompassing each series of objects, a handle at the front of the shelf and attached to said side members for manually pulling the corresponding series of objects forwardly upon the shelf, a fixed stop extending upwardly from the shelf at its forward edge and engageable by the forward object of the series to limit the forward movement of said series, and resilient means constituting a part of said first named means and secured at the back edge of the shelf and to said

pusher member to return said first named means and its handle to a rearwardly retracted position following a manual pulling



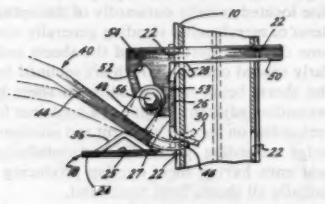
thereof, said resilient means having a substantially constant spring rate.

4,042,097

STORAGE SYSTEM

Leonard R. Clark, Oreland, and David W. Meehl, Hatboro, both of Pa., assignors to Standard Pressed Steel Co., Jenkintown, Pa.

Filed Mar. 19, 1976, Ser. No. 668,371
Int. Cl.[2] A47F 5/14, 5/00
U.S. Cl. 211—182 **12 Claims**



1. An elongated support member having a generally L-shaped cross-sectional configuration including a first leg and a second leg forming a generally right angle with said first leg, said first leg providing a track surface over which a storage container may slide and on which a storage container may be supported and said second leg providing a guide surface for guiding storage containers sliding on said track surface, said second leg being formed with first connection means adjacent one end thereof and second connection means adjacent the other end thereof, said first and second connection means each including a hook member and an aligned tab member, said hook members being located adjacent the free edge of said second leg and said tab members being located adjacent the intersection of said first and second legs, said tab members forming an angle greater than 90° with the portions of said second leg between each pair of a hook member and a tab member whereby said hook members can be engaged in slots on support posts and the support member can be rotated so that the tab members are received in other slots on the support posts, said tab members being bendable about their juncture with said second leg to a position where they form an angle less than 90° with the portion of said second leg between each pair of a hook member and a tab member whereby said support member is securely retained on the post members.

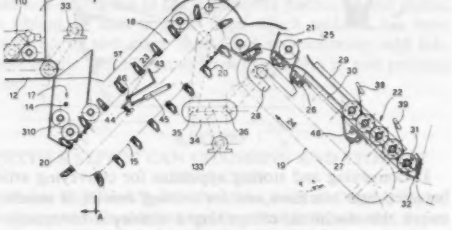
7. A storage system including a plurality of support posts extending in a generally vertical direction, each of said support posts being formed with a plurality of slots forming a row extending in a generally vertical direction, said slots being formed in at least one face of said support posts, support members extending between adjacent support posts in a pair forming a storage area in which storage containers can be supported, said support members including a first leg and a second leg forming a generally right angle with said first leg, said first legs providing track surfaces along which storage containers can slide and on which storage containers can be supported, said support surfaces extending at a generally right angle to the axis of said support posts, said second legs extending in a direction generally parallel to the axis of said support posts and providing guide surfaces for guiding storage containers sliding along said track surfaces, first connecting means formed on said support members adjacent one end thereof and second connecting means formed on said support members adjacent the other end thereof, said first and second connecting means securely retaining said support members on said pair of said support posts, each of said connecting means including a hook member and a tab member, said hook members being located adjacent the free edge of each of said second legs and said tab members being located adjacent the intersection of said first and second legs, said tab members forming an angle greater than 90° with the portion of said second legs between said hook members and said tab members whereby said hook members can be engaged in aligned slots on said pair of support posts and whereby said support members can be rotated such that said tab members are received in aligned slots on said pair of support posts, said tab members being bendable about a line where they join said second legs to a position forming an angle less than 90° with the portion of said second legs between said hook members and said tab members whereby a portion of said hook members and said tab members underlie the outer surfaces of their associated support post.

4,042,098

INTERMEDIATE STORAGE POINTS FOR COPS, AND THE INTERMEDIATE STORAGE POINTS THUS IMPROVED

Armando D'Agnolo, Porcia (PN), and Luigi Minto, S. Lucia Di Piave (TV), both of Italy, assignors to Officine Savio, S.p.A., Pordenone, Italy

Filed June 6, 1975, Ser. No. 584,350
Claims priority, application Italy, June 10, 1974, 83362/74
Int. Cl.[2] B65G 47/42
U.S. Cl. 198—393 **7 Claims**



1. Apparatus for conveying cops from bulk storage to a usage station through intermediate storage points comprising a first conveyor belt which is sloped substantially upwardly carrying lateral limiting means to define single cop compartments, a second substantially horizontal or downwardly sloped conveyor belt which is positioned to receive cops discharged from said first belt, said second belt having pivotal limiting means to define single cop compartments whereby the limiting means for forming said single cop compartments pivot downwardly; an intermediate storage point substantially parallel and above said second belt carrying lateral guides for said cops and a frontal stop means at the end of said intermediate storage point; at least one compartment of the first conveyor belt substantially coinciding with one compartment of said second conveyor belt at a temporary position where they are both haltable at the same time, said first belt movable step by step out of phase with said second belt which is movable step by

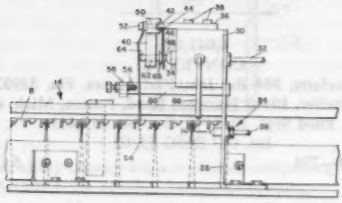
step, means for loading cops in bulk positioned upstream of the movement of said cops from said first conveyor belt and at least one spacer belt intermediate said cop loading means and said first conveyor belt to control the content of cops, said spacer belt being substantially parallel to and at least partially above an exit edge of the loading means and at right angles to said first conveyor belt.

4,042,099

AIR CONTROLLED SWITCH

Walter S. Sterling, Quincy, Mass., assignor to Pneumatic Scale Corporation, Quincy, Mass.

Filed Sept. 12, 1975, Ser. No. 613,028
Int. Cl.² B65G 47/14, 43/08, 53/00
U.S. Cl. 198—393 **13 Claims**



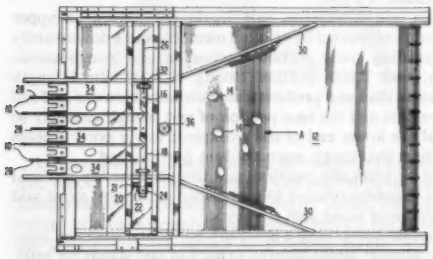
13. In an apparatus for processing items, a passage along which items are moved in a continuous stream by jet propulsion produced by a jet disposed adjacent to one side of the passage so as to direct a jet of air across the passage at an angle to advance items along the passage, means for delivering items to said passage, control means for stopping and starting said means, said control means including pressure-responsive means operable when the jet stream is prevented from crossing the passage by a standing line of items in the passage to effect operation of the control means to stop delivery and means for maintaining the pressure supplied to said pressure-responsive means at a lower than operating pressure so long as the items continue to flow freely along said passage.

4,042,100

APPARATUS FOR ARRANGING ARTICLES

Ross Morrone, Lawrenceville, N.J., assignor to Otto Niederer Sons, Inc., Pennington, N.J.

Filed July 29, 1976, Ser. No. 709,675
Int. Cl.² B65G 47/26
U.S. Cl. 198—446 **6 Claims**



1. An apparatus for arranging eggs and like articles which are positioned at random locations upon a conveyor by placing the eggs in orderly rows thereon, which comprises:

a. a plurality of channeling devices above the conveyor extending parallel with respect thereto to receive randomly positioned eggs and arrange them in orderly rows;

b. a rotatable gear means in engagement with the conveyor, said gear means being operable to rotate responsive to movement of the conveyor;

c. a cam means attached to said gear means;

d. a movably mounted carriage plate positioned above said channeling devices;

e. a cam follower movably secured to said carriage plate and biased into engagement with said cam means on said gear means;

f. biasing means attached to said carriage plate to urge said follower secured thereto into engagement with said cam means; and

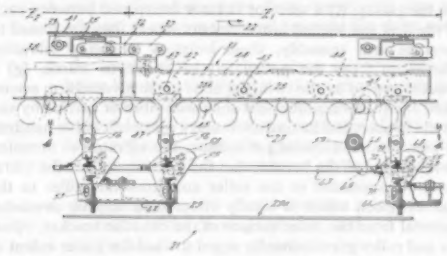
g. a plurality of separator means secured to said carriage plate and extending downward therefrom adjacent the front ends of said channeling devices, said separator means adapted to move slightly in the horizontal plane to aid in the dividing of oncoming randomly positioned eggs into rows within said channeling device.

4,042,101

ACCUMULATING CONVEYOR

Robert Krammer, Farmington, Mich., and Michael T. McClellan, St. Paul, Minn., assignors to Standard Conveyor Company, North St. Paul, Minn.

Filed Nov. 4, 1975, Ser. No. 628,797
Int. Cl.² B65G 13/02
U.S. Cl. 198—460 **21 Claims**



10. An accumulating conveyor comprising; a series of rotatable elements for supporting an article to be conveyed, said elements being disposed in side-by-side relationship along the path of the conveyor; a powered propelling member disposed above and adjacent one edge of said path; accumulating means including a frame disposed above said propelling member and being mounted for vertical movement with respect to said rotatable elements; a plurality of pressure rolls eccentrically mounted for rotation on said frame, said frame being normally disposed in a driving position in which said rolls rest upon and exert a downward pressure on said propelling member to cause it to drivingly engage said rotatable elements, said pressure rolls being rotatable by said propelling member when said frame is in said driving position to cause continual vertical oscillating movement of said frame between upper and lower positions; and retractable holding means for holding said frame in said upper position so that said propelling member does not drivingly engage said elements, thereby permitting the accumulation of articles on said conveyor.

4,042,102

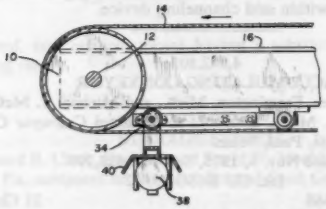
VIBRATORY CLEANER FOR AN ENDLESS CONVEYOR BELT

Theodore S. Wadensten, P.O. Box 8, Stilson Road, Wyoming, R.I. 02898

Filed June 9, 1976, Ser. No. 694,379
Int. Cl.² B65G 45/00
U.S. Cl. 198—494 **6 Claims**

1. A vibratory belt cleaning apparatus for an endless conveyor belt as carried by head and tail pulleys on and by a conveyor frame, said apparatus disposed immediately adjacent

the tail pulley to remove attracted particles from the carrying surface of the belt as the belt is moved on its return portion of movement and prior to the return extent of belt reaching a snubber roller, idler pulley and the like which engages the carrying surface of the belt on the return extent, said belt cleaning apparatus including: (a) a support means for the conveyor belt and frame; (b) a first pair of arm members of like length, each pivotally retained at one end to and by the conveyor frame; (c) a second pair of arm members each having one end adapted to retain and carry a roller shaft, the other end of these arms adapted for attachment to the first arm member; (d) a shaft carried at each end by one of the second arm members; (e) a freely turning roller carried on and by the shaft, the roller disposed to engage the inside surface and under extent of the conveyor belt at said immediately adjacent position next to



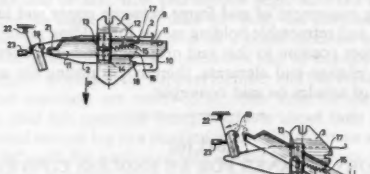
the tail pulley; (f) a vibrator isolator interposed between each of the first and second arm members where they are joined to form an arm assembly, these isolators inhibiting vibration transmittal from the pulley to the conveyor frame; (g) a bracket carried by the swinging ends of the pivoted arm assemblies, and (h) a variable speed and force vibrator carried by and on the bracket and having a vibratory range of twelve hundred to nine thousand cycles per minute, the vibrator so mounted and attached to the bracket that the vibrations from the vibrator are transmitted to the roller and from the roller to the conveyor belt which is locally vibrated to remove unwanted material from the outer surface of the belt, the bracket, vibrator and roller gravitationally urged toward the under extent of the belt with only the roller engaging the belt and with the vibrations from the vibrator isolated by the arm mounted isolators from the conveyor frame.

4,042,103

INSTALLATION FOR THE TREATMENT OF CONTAINER-PACKED COMMODITIES

Salomon Santen, Amsterdam, Netherlands, assignor to Stork Amsterdam B.V., Amstelveen, Netherlands

Filed June 16, 1976, Ser. No. 696,559
Claims priority, application Japan, June 19, 1975, 50-75412
Int. Cl.[2] B65G *17/46*
U.S. Cl. 198—645 **1 Claim**



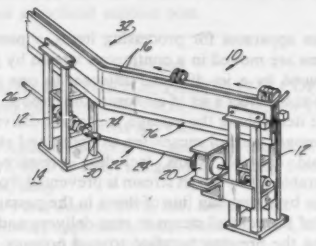
1. Installation for the treatment of container-packed commodities, in particular for the sterilization of pharmaceutical products or the like foodstuff packed in pouches, said installation comprising an endless conveyor with carriers for the containers, travelling through a treatment space, the conveyor passing subsequently along a discharge station and a loading station lying outside the treatment space, wherein each carrier (2) is mounted mainly perpendicular to the conveyor(1) whilst each carrier is provided with a sidewardly directed opening (9) for the passage of the containers, said opening being closed by a cover (10) mounted near one end of a lever (11) which is pivotally connected to the conveyor with additional means for a limited longitudinal displacement against the action of a resilient element (12), the pivotal movement being restricted by a cam-member (15) slidable along a cam surface (16) with at least one end recess (17, 18) for locking the cover in at least one of both its end positions (I, II), a mainly stationary abutment (19, 20) being provided before the discharge station (7) and beyond the loading station (8) resepctively, for engaging a protruding part (21, 15) of the lever in order to first shift the lever longitudinally and thereafter retain the lever so that by the continued travel of the conveyor, the lever is subsequently tilted so as to move the cover into one of its end positions.

4,042,104

CONVEYOR

James L. Furlette, 984 Bal Isle, Fort Myers, Fla. 33902, and Donald Stadler, 10400 Hartland Road, Fenton, Mich. 48430

Filed Sept. 29, 1975, Ser. No. 617,411
Int. Cl.[2] B65G *25/02*
U.S. Cl. 198—774 **5 Claims**



1. In combination:

a conveyor comprising at least three stands each secured to a base and in spaced apart relationship,

said conveyor further comprising a pair of spaced and parallel rail members mounted to and between said stands in a generally horizontal position so that said rail members are supported only by said stands and wherein said rail members include at least one angled section, a trough assembly having an elongated base portion, said base portion being positioned beneath and parallel to said rail members and spaced apart from said rail members at a predetermined distance,

at least one workpiece, said workpiece having an upper portion supported by said rail members and a downwardly depending lower portion received in said trough assembly, said lower portion having a longitudinal length greater than said predetermined distance between said rail members and the base portion of said trough assembly so that the lower end of the workpiece lower portion abuts against the trough assembly base portion, and

means to vertically oscillate said trough assembly and said rail members relative to each other to thereby move said workpiece along said conveyor,

said means comprising a generally horizontal shaft and bearing support means secured to each of said stands for rotatably receiving said shaft, a generally horizontal drive rod disposed between each pair of stands and underneath said rail members, each of said drive rods being connected by universal joint means to said shafts whereby rotation of one drive rod simultaneously rotatably drives all of said shafts and said drive rods, means for rotating one of said drive rods, and means disposed in each of said stands for simultaneously and in unison translating the rotary motion

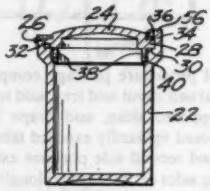
of said shafts into vertical, oscillating motion of said trough assembly and said rails relative to each other.

4,042,105

SAFETY CLOSURE FOR A CONTAINER AND METHOD FOR OPENING THE CLOSURE

Clarence R. Taylor, 28 Woodside Drive, Penfield, N.Y. 14526

Filed June 28, 1976, Ser. No. 700,584
Int. Cl.² B65D *43/16, 55/02*
U.S. Cl. 206—1.5 **11 Claims**



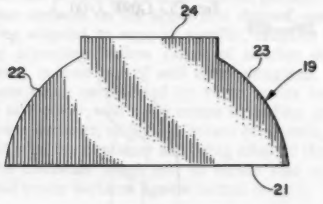
1. A safety closure for a container comprising:
a flexible body member having an opening;
a seat on said body member surrounding said opening;
a cap having a bottom surface mountable on said seat for closing said opening;
means on said cap and body member for releasably securing said cap on said seat; and
cam means on said body member adapted, when manually moved by a force toward and underneath said bottom surface to a depressed position and the force progressively applied while in said depression position along the length of said cam means, to cam said cap out of said seat against the bias of said securing means.

4,042,106

RECORD PROTECTOR

Paul W. Smith, 2818 Louisiana Ave. South, St. Louis Park, Minn. 55426

Filed Sept. 8, 1976, Ser. No. 721,554
Int. Cl.² B65D *85/30*
U.S. Cl. 206—313 **6 Claims**



1. A hand-held protector device for removing a phonograph disc record of a given diameter, said record having a central spindle engaging opening from a record jacket, for placing the record on a phonograph spindle, for removing the record from the spindle and reinserting in a record jacket, all without touching the record, said protector device comprising:

A) an envelope composed of a pair of flat sheet members in face-to-face abutment,

1. said envelope being open along one straight edge and adapted to receive a record between the sheet members,
2. the length of the envelope along said straight edge being less than the diameter of the phonograph disc,
3. said sheet members being connected at their edges over at least a portion of the perimeter of said envelope which corresponds generally in geometrical configuration to the perimeter of the phonograph disc, and
4. the maximum width of said envelope being less than the radius of the phonograph disc, and

B. a straight handle portion on said envelope,

1. the edge of said handle portion being generally parallel to said open edge, and
2. the length of said edge being less than the length of the envelope.

3. A phonograph record package comprising in combination:

A. a phonograph record jacket composed of square flat sheet members in closely spaced face-to-face relation joined together along three sides and open along one edge,

B. an inner sleeve disposed in said jacket opposite from said open edge and comprised of:

1. a pair of flat rectangular sheet members in closely spaced face-to-face relation,
2. the length of said sheet members being substantially equal to the inside width of said jacket, and
3. the width of said sleeve being more than one-half the width of said jacket,

C. a protector device disposed in said jacket for removing a phonograph disc record of a given diameter, said protector device comprising:

1. an envelope composed of a pair of flat sheet members in face-to-face abutment,
   a. said envelope being open along one straight edge and adapted to receive a record between the sheet members,
   b. the length of the envelope along said straight edge being less than the diameter of the phonograph disc,
   c. said sheet members being connected at their edges over at least a portion of the perimeter of said envelope which corresponds generally in geometrical configuration to the perimeter of the phonograph disc, and
   d. the maximum width of said envelope being less than the radius of the phonograph disc, and
2. a straight handle portion on said envelope,
   a. the edge of said handle portion being generally parallel to said open edge, and
   b. the length of said edge being less than the length of the envelope, the edge of the handle portion of said device being in substantial longitudinal alignment with the sheet member edges defining the open edge of the jacket, and the open straight edge of said device being in abutment with the edge of said inner sleeve, and

D. a phonograph disc record disposed in said jacket between the sheet members of said protector device and said inner sleeve.

4,042,107

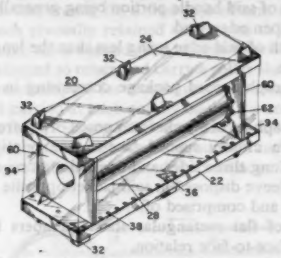
RETURNABLE ROLL SHIPPING CONTAINER

Robert N. Kendig, Wilmington, Del., assignor to ICI United States Inc., Wilmington, Del.

Filed Feb. 24, 1975, Ser. No. 552,069
Int. Cl.² B65D *19/26, 19/42*
U.S. Cl. 206—386 **6 Claims**

1. A shipping container for shipping an elongated article comprising upper and lower rigid pallets, a pair of spaced upright end plate assemblies between said pallets and in engagement therewith, said end plate assemblies including means extending inwardly for supporting said elongated article therebetween, said pallets being of similar structure and each comprising (a) a platform, (b) support means extending outwardly from one side of said platform, the support means of the lower pallet extending downwardly and supporting the container, said support means being arranged so as to permit interlocking engagement between the support means of two similar but oppositely oriented pallets and thereby permit vertical stacking of a plurality of shipping containers, (c) first means on a surface

of each pallet extending from one end of said pallet toward the center thereof for receiving one of said end plate assemblies and second means on a surface of each pallet extending from the other end of said pallet toward the center thereof for receiving the other of said end plate assemblies, each of said



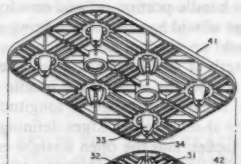
means comprising a plurality of longitudinally spaced end plate-engaging means, each of said end plate-engaging means being capable of engaging an end plate and retaining it in a desired position whereby each end plate can be placed in any one of a plurality of positions independently of the other end plate in accordance with the length of the elongated article.

4,042,108

STACKABLE YARN SUPPORT

Dale M. Brethauer, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 6, 1976, Ser. No. 730,024
Int. Cl.[2] B65D *85/67*
U.S. Cl. 206—392 **4 Claims**



1. A device for supporting bobbins of yarn wound on open-ended tubes, comprising a one-piece pallet molded of synthetic plastic and a plurality of spaced holding members integrally molded to the pallet which extend from each face of the pallet in the form of bullet-shaped protrusions adapted to fit in the ends of yarn tubes to maintain yarn bobbins in spaced relationship; the portion of each holding member which extends from one face of the pallet being composed of two segments disposed at 180° to each other, the portion of each holding member which extends from the second face of the pallet being composed of two segments disposed at 180° to each other and offset 90° from the segments on the first face, and the configuration of the segments being such that a plurality of empty pallets can be stacked with the holding members interengaged until used for supporting bobbins.

4,042,109

MEDICAL PROCEDURE PACKAGE

Donald S. Barcan, Union, N.J., assignor to C. R. Bard, Inc., Murray Hill, N.J.

Filed Jan. 21, 1976, Ser. No. 651,881
Int. Cl.[2] B65D *1/34, 85/00*; A61B *19/02*
U.S. Cl. 206—440 **26 Claims**

1. A medical procedure package comprising a tray and a drape secured to and about said tray, said tray having two pairs of generally opposed sides, said drape including generally diagonally opposed upwardly exposed tabs, said drape having opposed first and second side portions extending from a first pair of opposing sides of the tray and longitudinally beyond the second pair of opposing sides of the tray, one of said tabs appearing on each of said first and second side portions, said first and second side portions being transversely fan foldable to a point inward of the corresponding first pair of sides of the tray and defining longitudinal fan folds positioned within the transverse confines of the first pair of sides and projecting longitudinally beyond the second pair of sides so as to form fan folded end portions, the tabs remaining upwardly exposed at diagonally opposed points longitudinally beyond the second pair of opposed sides and on the fan folded end portions, said end portions being longitudinally fan foldable to a point inward of the corresponding second pair of sides of the tray and defining fan folds positioned within the longitudinal confines of the second pair of sides, said tabs remaining upwardly exposed at diagonally opposed points within the confines of the tray.

4,042,110

CARTON DISPLAY DEVICE

Richard H. Guernsey, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed May 24, 1976, Ser. No. 689,275
Int. Cl.[2] G09F *3/00*
U.S. Cl. 206—459 **4 Claims**

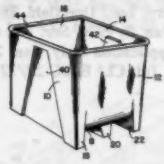
1. In an integral paperboard carton having a reclosable cover, the improvement comprising a display device panel integrally connected to a first tuck flap with a first crease line therebetween, said first tuck flap being connected by a second crease line to a similar second tuck flap adjacent the carton's cover, and folded against said second tuck flap along said second crease line for insertion into the interior of the carton when said cover is closed, said display device being detachable from said carton by a weakened area in one of said crease lines and having a fastening tab at its free end for removable engagement with a slot in the front wall of the carton to maintain said display device panel flush with the carton's front wall.

4,042,111

CONTAINER FOR BULK MATERIAL

Rush B. Smith, Philadelphia, Pa., assignor to Pennsylvania Pacific Corporation, Warminster, Pa.

Filed Dec. 12, 1975, Ser. No. 640,004
Int. Cl.[2] B65D *21/02*
U.S. Cl. 206—508 2 Claims



1. A container for the handling and storage of large quantities of bulk material comprising a unitary molded plastic liquid-tight tub having a bottom and four upwardly extending sides; a lip along the upper edges of the sidewalls; three parallel, laterally spaced, downwardly extending, hollow ridges forming supporting members for the container being integrally molded in said bottom; said ridges extending substantially the full length of the bottom of said tub, and establishing, between adjacent pairs of ridges, spaces for the entry of the tines of a forklift or pallet jack; removable cover means adapted to rest on the upper edges of said four upwardly extending sides and to enclose said tub; said cover means also being composed of molded plastic; said cover means having means for engaging the sides of the tub and preventing lateral movement of the cover with respect to the tub comprising four downwardly extending sides forming a skirt adapted to fit tightly over the lip along the upper edges of the tub sidewalls; said cover means also having means providing three elongated, parallel substantially coplanar surfaces on the upper side thereof; said cover surfaces being adapted to support parallel, laterally spaced, downwardly extending hollow ridges of another container resting thereon; at least one of said three elongated, parallel cover surfaces being surrounded by ridge means integrally molded into said cover; said ridge means extending upwardly from said cover surfaces; said ridge means conforming to the shape of a ridge of the container and being adapted thereby to surround said container ridge and to secure said container resting on said cover surfaces against lateral motion.

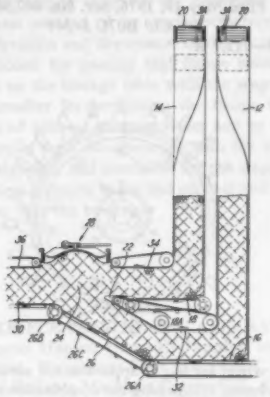
4,042,112

CONVEYING CIGARETTES AND OTHER ROD-LIKE ARTICLES

Desmond Walter Molins; Dennis Hinchcliffe; Peter Alec Clarke, and Frank Heybourn, all of London, England, assignors to Molins Limited, England

Filed Sept. 19, 1975, Ser. No. 614,899
Claims priority, application United Kingdom, Oct. 3, 1974, 42872/74
Int. Cl.[2] B26D *7/06*
U.S. Cl. 209—73 22 Claims

1. Apparatus for conveying filter-tipped cigarettes, comprising means for receiving two streams of such cigarettes with the filters of the two streams facing in opposite directions, means for conveying the two streams side by side while twisting the streams in opposite directionsabout longitudinal axes of the streams so that the cigarettes of the two respective streams are then parallel, with their centers all lying substantially in a



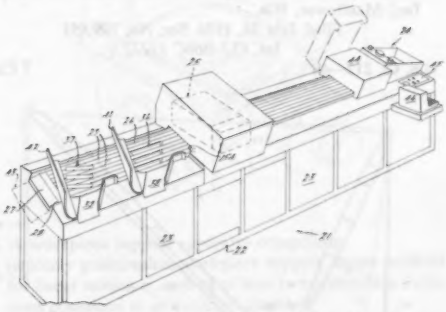
common plane transverse to the axes of the cigarettes and with the filters all facing in the same direction, and means for merging the two streams by movement of the streams substantially in directions transverse to the axes of the cigarettes.

4,042,113

SORTING DEVICE FOR MAGAZINE OR THE LIKE

Leroy A. Duncan, Lathrup Village, and Steve M. Aksamit, Melvindale, both of Mich., assignors to Standard Alliance Industries, Inc., Oak Brook, Ill.

Filed June 18, 1976, Ser. No. 697,435
Int. Cl.[2] B65G *47/34*
U.S. Cl. 209—74 R 20 Claims



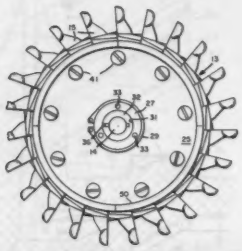
1. A sorter comprising an elongated bed, a hopper at one end of said bed for receiving a stack of magazines, belt means constantly movable along said bed, a portion of said belt means extending beneath said hopper, a scanner downstream from said hopper, diverter means on said bed downstream from said scanner, and separating means for ensuring that there is adequate space between magazines when they reach said scanner, said separating means comprising lifting means at the bottom of said hopper adjacent said belt means and movable between an upper position raising said magazines above said belt means and a lower position permitting the lowermost magazine to be removed from the stack by said belt means, and separating finger means downstream from said lifting means and movable between an upper position permitting the magazines on said belt means to pass therebelow and a lower position urged against said bed so as to intercept and stop an approaching magazine.

4,042,114

FEED WHEEL FOR A SORTING APPARATUS

Tor Arild, Woodside, and Russell R. Ames, San Jose, both of Calif., assignors to Accusort Corporation, Belmont, Calif.

Filed May 19, 1976, Ser. No. 687,981
Int. Cl.[2] B07C 5/344
U.S. Cl. 209—111.7 R **12 Claims**



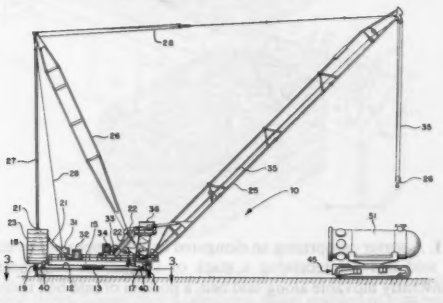
1. A feed wheel for use in apparatus for sorting small particles, such as beans, comprising the combination of a pair of disc members, a hub, one of said members being attached to said hub, means detachably supporting the other of said members on said hub, said members being positioned on said hub in parallel spaced relation, a plurality of particle-receiving scoops each having attaching means which when the scoop is positioned between peripheral portions of said disc members will engage said disc members and releasable locking means for clamping and locking said peripheral portions of said disc members to releasably hold said scoops.

4,042,115

ROTARY COUNTERWEIGHT CRANE WITH A REMOVAL TRACK SECTION

Daniel E. Beduhn; James G. Morrow, Sr., and David J. Pech, all of Manitowoc, Wis., assignors to The Manitowoc Company, Inc., Manitowoc, Wis.

Filed July 28, 1976, Ser. No. 709,451
Int. Cl.[2] B66C 23/72
U.S. Cl. 212—48 **7 Claims**



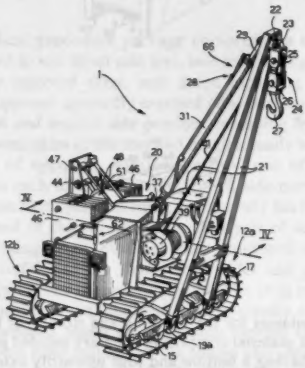
1. A crane assembly comprising, in combination, a ring defining an annular track, removable structure mounted within said ring defining a central king pin, an elongated platform fitted for rotation on said king pin, said platform having a boom carrier at one end in riding contact with said track and a counterweight support at the other end also in riding contact with said track, a boom pivoted on said carrier above said track, means including a mast on said platform interconnecting said counterweight support and said boom for positioning said boom, a load block suspended on said boom, apd means including powered hoists mounted on said platform for powered control of said boom and said load block, said ring having a removable section whereby said removable structure and said section can be removed from the assembly to permit a self-powered transporter having a king pin to be run within the ring and beneath the platform and be connected to the ring and platform to create a mobile assembly.

4,042,116

TRACK LAYING TRACTOR WITH MOVABLE BOOM WHICH CAN BE TILTED LATERALLY

Giorgio M. Bertolino, Torinio, Italy, assignor to Fiat-Allis Construction Machinery, Inc., Deerfield, Ill.

Filed Jan. 9, 1976, Ser. No. 647,725
Claims priority, application Italy, Jan. 24, 1975, 67163/75
Int. Cl.[2] B66C 23/72
U.S. Cl. 212—140 **6 Claims**



1. In a crawler tractor including a tractor body supported by a pair of track laying units which comprise a track support frame about which the tracks pass in an endless path of movement, a load lifting crane mechanism having a movable boom supported on one side of the tractor body at the outer side of the adjacent track unit and a pulley device for lifting or moving loads, a variably positionable load balancing counterweight mechanism supported from the tractor body on the side opposite the crane mechanism for balancing the load connected to the crane mechanism, the improvement comprising

base support means extending transversely between and carried by the track support frame on each track unit for connecting the crane and counterweight mechanism to the tractor body,

each said track support frame carrying pivot means on an outer side thereof positioned within the area defined by the path of movement of the tracks moving endlessly thereabout,

one of said pivot means detachably securing a first portion of the crane mechanism to one track support frame for lateral movement relative thereto, and the other of said pivot means removably securing a portion of the counterweight mechanism to the other track support frame for lateral movement relative thereto,

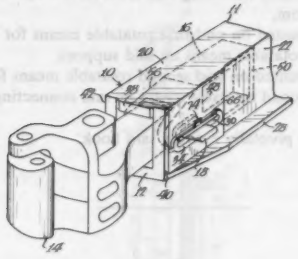
a support frame secured to and extending upwardly from said base support means for pivotally connecting, on opposite sides thereof, a second portion of the crane mechanism and another portion of the counterweight mechanism for lateral movement relative thereto,

means for pivotally moving said crane and counterweight mechanism laterally of said track support frame when pivotably connected thereto to balance the crawler tractor during load lifting operation, and

means for pivoting said second portion of said crane mechanism longitudinally of said track support frames from a first position in which said first and second portions of said crane mechanism are connected for load lifting operation to a second position in which said first and second portions of said crane mechanism are disconnected when said pivot means securing said crane mechanism to the track

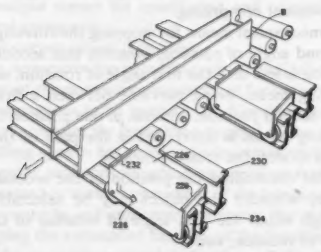
support frame is detached to facilitate transporting the tractor by limiting the width thereof to the outer edges of the tracks.

4,042,117
WEAR PLATE
Carl D. McClurg, Lockbourne, Ohio, assignor to Buckeye International, Inc., Columbus, Ohio
Filed July 7, 1975, Ser. No. 593,196
Int. Cl.[2] B61G 9/20
U.S. Cl. 213—50.5 **6 Claims**



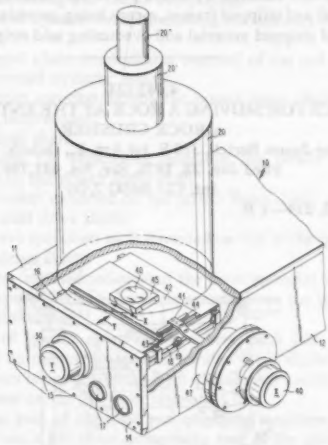
1. A center sill assembly for securing a coupler to said center sill in a railway car, comprising in combination:
a center sill having a pair of side walls, each of said walls having a key slot extending therethrough and an outer peripheral rib surrounding each key slot on the outer side of said wall and an inner peripheral rib surrounding each key slot on the inner side thereof and an upper bearing surface and lower bearing surface for each key slot;
an elongated draft key extending through each key slot and normally biased by the weight of said coupler toward said upper bearing surface of each key slot;
a wear plate for each key slot having elongated and substantially planar web means terminating intermediate the ends of the respective key slot for facile positioning within the respective key slot adjacent said upper bearing surface, said web means having a hardenable wear surface for engagement with the top of the draft key so as to protect the upper bearing surface from the rubbing action of the draft key during motion of the railway car, and flange means for securing each wear plate to said sill at one peripheral rib and for maintaining said web means in position adjacent said upper bearing surface.

4,042,118
COMBINATION ROLLER CONVEYOR AND CROSS-CONVEYOR SYSTEM
Hans V. Schmidt, Mount Vista Road, Kingsville, Md. 21087
Filed Mar. 9, 1976, Ser. No. 665,372
Int. Cl.[2] B65G 47/90
U.S. Cl. 214—1 BB **9 Claims**



6. In combination, a conveyor, a cross-conveyor passing through at least a portion of the conveyor, a storage table adjacent the cross-conveyor, the cross-conveyor having wagon structure elevatable and depressable for picking up elongate beams and the like from the storage table and carrying them to and depositing them on the conveyor, an upright flange on at least one end of the wagon structure; the amplitude of said elevation and depression of the wagon structure being proportioned for passing said flange beneath said an elongate beam on the storage table with the wagon structure depressed, thereafter for permitting the flange to engage a lateral portion of said an elongate beam and to urge it into orientation parallel with the conveyor with the wagon structure partially elevated, and thereafter for the wagon structure to pick up said an elongate beam and carry it and deposit it in said orientation onto the conveyor.

4,042,119
WORKPIECE POSITIONING APPARATUS
Javathu Kutikaran Hassan, Hopewell Junction, and Carl Vincent Rabstejnek, Wappingers Falls, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed June 30, 1975, Ser. No. 592,152
Int. Cl.[2] B25J 3/04
U.S. Cl. 214—1 CM **5 Claims**



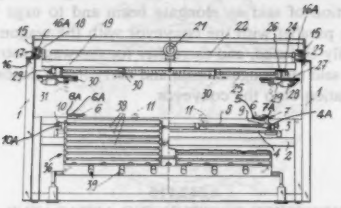
5. A workpiece support apparatus comprising:
a remotely positionable workpiece support means adapted for linear motion in each of at least two orthogonal directions contained in an enclosed chamber;
first and second motive means mounted on the walls externally of the enclosed chambers;
one of the walls of the chamber, having the first motive means fixedly attached thereto;
said one of the walls and first motive means being removable together with at least a portion of the workpiece support apparatus from the enclosed chamber;
each said first and second motive means having respective first and second drive means;
engaging means fixedly attached to the second drive means and to said workpiece support apparatus;
said engaging means permitting relatively frictionless motion along a longitudinal axis while constraining motion perpendicular to the longitudinal axis;
such that at least a portion of said workpiece support apparatus is adapted to be disengaged from said second drive means.

4,042,120

MACHINE FOR STRIPPING FROM FRAMES, PARTICULARLY PIN FRAMES, MATERIALS RESTRAINED TO SAID FRAMES

Vito Frigo, Cervignano del Friuli (Udine), Italy, assignor to Aussatuft S.p.A., Italy

Filed Aug. 21, 1975, Ser. No. 606,529
Claims priority, application Italy, Sept. 17, 1974, 27360/74
Int. Cl.² B65G *47/91*
U.S. Cl. 214—1 BB **7 Claims**



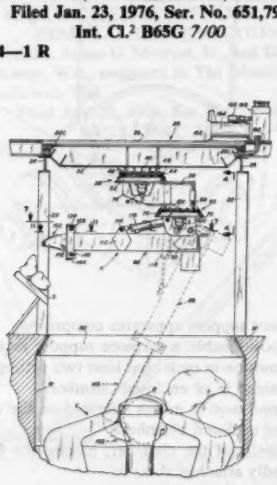
1. A machine for separating from frames, particularly pin frames, materials which have been restrained to said frames, such a machine comprising extractor means and guide means for accommodating dressed frames and positioning the same above said extractor means, the latter being upward movable to strip said material from said pin frame resulting in stripped material and stripped frames, means being provided for receiving said stripped material and evacuating said stripped frames.

4,042,121

DEVICE FOR MOVING A ROCK AT THE ENTRANCE OF A ROCK CRUSHER

Maurice James Bartell, 310 S. 1st Ave. E., Duluth, Minn. 55802

Filed Jan. 23, 1976, Ser. No. 651,794
Int. Cl.² B65G *7/00*
U.S. Cl. 214—1 R **7 Claims**



1. Device for moving a rock at the entrance of a rock crusher comprising:

a. an elongated support having means for mounting the support horizontally upon a horizontal wall,

b. first rotatable means carried by said support and depending therefrom,

c. second rotatable means,

d. rigid means extending within the extent of said elongated support and connecting said second rotatable means to said first rotatable means in depending relation with the rotational axis thereof offset from that of said first rotatable means,

e. a boom,

f. means pivotally mounting the inner end of said boom on said second rotatable means pivotal from a first horizontal position to and from alternatively depending angularly disposed positions,

g. means connected to said boom and said second rotatable means for pivoting said boom in a substantially vertical plane,

h. a hook,

i. means pivotally mounting said hook on the outer free end of said boom,

j. means mounted on said first rotatable means for rotating said first rotatable means on said support,

k. means mounted on said second rotatable means for rotating said second rotatable means on said connecting means, and

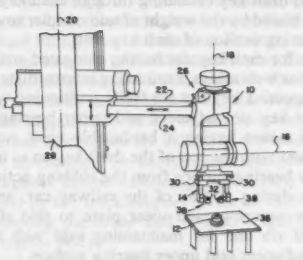
e. means for pivotally moving said hook.

4,042,122

REORIENTATION DEVICE FOR AN OBJECT MANIPULATOR

Donald M. Espy, and James L. Henry, both of Dayton, Ohio, assignors to The Bendix Corporation, Southfield, Mich.

Filed May 27, 1975, Ser. No. 581,326
Int. Cl.² B65G *47/90*
U.S. Cl. 214—1 CM **4 Claims**



1. In combination with a manipulating device of the type having means for holding an object, means for moving said object in a first direction, means for moving said objection a second direction which is transverse to said first direction wherein movement in said second direction is independent of movement in said first direction, means for rotating the object held by the holding means, and mechanical means selectively interposed in the path of the rotating means for stopping the rotating means after a rotation through a first angle of rotation, the improvement comprising:

second mechanical means for stopping the rotating means at a second angle of rotation, wherein said second angle of rotation is less than the first angle of rotation, said second stopping means being movable between a first position and a second position, wherein in one position the second stopping means is interposed in the path of the rotating means to stop the rotating means;

means for controlling the position of the second stopping means, whereby the object may be selectably rotated through either the first angle of rotation of the second angle of rotation; and

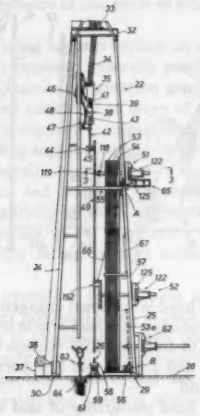
means for sensing the position of the rotating means for indicating the angle of rotation completed.

4,042,123

AUTOMATED PIPE HANDLING SYSTEM

Loren B. Sheldon, 8226 Bairnsdale, Houston, Tex. 77070; James R. Tomashek, 114 E. Division St., Wooddale, Ill. 60191; Robert R. Kelly, 138 Jamison Lane, Hoffman Estates, Ill. 60172; James S. Thale, 2749 Woodbine, Evanston, Ill. 60201; Jashwant C. Shah, 923 Anderson Terrace East, Des Plaines, Ill. 60016, and Donald H. Ward, 418 Ridgewood, Glen Ellyn, Ill. 60137

Filed Feb. 6, 1975, Ser. No. 547,375
Int. Cl.[2] E21B *19/00*
U.S. Cl. 214—2.5 28 Claims



1. A drill pipe handling system for the automated handling of drill pipe lengths, in a well being drilled or otherwise serviced, comprising:

rack means for receiving pipe stands and supporting said pipe stands in spaced apart vertical rows adjacent the side of a derrick, said rack means including a series of parallel rows for receiving said pipe stands and fingers selectively actuable for forming rectangular openings along said parallel rows for locking said pipe stands in place;

sensor means for sensing the individual actuation of said fingers;

racker means for successively moving said drill pipe stands between a position adjacent the center of the derrick and the rack means;

a racker arm extending horizontally from said racker means, said racker arm having a gripping means at the outer end thereof for engaging the drill pipe stands;

computer control means for controlling said rack means, said fingers, said racker means, and said racker arm;

said computer control means including,

a programmable general purpose digital computer;

a computer program for providing sequential instructions to said digital computer;

input-output means for monitoring and controlling said digital computer;

said input-output means including,

display apparatus for providing visual indication of the status of the computer program and for permitting data or instructions to be input to the digital computer; and

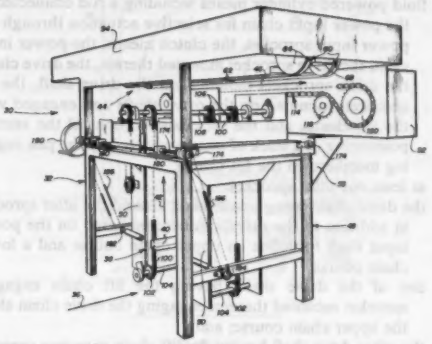
a driller's console for permitting control of the drill pipe handling system by inputing instructions to the digital computer, said console including a selector for selecting automated or manual operations of the handling system, and controls and indicator apparatus for starting or stopping the automated function of the handling system and for providing visual indication of the operating status of the handling system.

4,042,124

PAN UNSTACKING AND STACKING SYSTEM

William Perrin Bowdry, III, Dallas, Tex., and Irwin Edward Wickam, Wayzata, Minn., assignors to Stewart Engineering & Equipment Co., Richardson, Tex.

Filed June 2, 1975, Ser. No. 583,838
Int. Cl.[2] B65G *57/04*
U.S. Cl. 214—6 DS 64 Claims



8. In a pan stacking and unstacking system, apparatus for vertically positioning pan stacks comprising:

fluid powered cylinder means including a selectively extendable rod;

a power input chain connected at one end of the rod of the fluid powered cylinder means;

a power input sprocket having the power input chain constrained therearound;

a power input shaft;

clutch means for selectively coupling the power input sprocket to the power input shaft;

a drive sprocket mounted on the power input shaft;

spaced parallel drive shafts;

a pair of drive sprockets each mounted on one of the spaced, parallel drive shafts;

a drive chain constrained around the drive sprocket on the power input shaft and the drive sprockets on the spaced, parallel drive shafts;

two pairs of spaced apart lift sprockets, each pair being mounted on one of the spaced, parallel drive shafts;

opposed pairs of spaced, parallel lift chains each constrained around one on the lift sprockets; and

at least one pair of opposed pan engaging members each mounted on a lift chain comprising one of the pairs for movement thereby into engagement with the lowermost pan comprising a stack of pans;

whereby the fluid powered cylinder means operates through the power input chain, the power input sprocket, the clutch means, the power input shaft, the drive sprocket mounted on the power input shaft, the drive chain, the drive sprockets mounted on the spaced, parallel shafts, the spaced, parallel shafts, the lift sprockets, and the lift chains to control the vertical positioning of the end engaging members and a stack of pans supported thereby; and

biasing means connected to the opposite end of the power input chain from the fluid powered cylinder means for maintaining tension on the power input chain.

24. In a pan stacking and unstacking system, apparatus for vertically positioning pan stacks comprising:

opposed pairs of spaced, parallel lift chains each constrained around lift sprockets mounted on spaced, parallel shafts;

at least one pair of opposed pan engaging members each mounted on the lift chains comprising one of the pairs for movement thereby into engagement with the lowermost pan comprising a stack of pans;

one of the shafts which support the lift sprockets comprising a drive shaft and extending to a drive sprocket;

a drive chain constrained around the drive sprockets secured to each of the drive shafts and around a drive sprocket mounted on a power input shaft;

clutch means mounted on the power input shaft for selectively forming a driving connection thereto;

a power input sprocket mounted on the clutch means;

a power input chain constrained around the power input sprocket;

fluid powered cylinder means including a rod connected to the power input chain for selective actuation through the power input sprocket, the clutch means, the power input shaft, the drive sprocket mounted therein, the drive chain, the drive sprockets mounted on the drive shaft, the lift sprockets mounted on the drive shafts and engaged with the lift chains, and the lift chains to control the vertical positioning of a stack of pans supported by the pan engaging members on the lift chains;

at least one idler sprocket;

the drive chain being constrained around the idler sprocket in addition to the drive sprocket mounted on the power input shaft to define an upper chain course and a lower chain course;

one of the drive shafts having the lift chain engaging sprocket mounted thereon engaging the drive chain along the upper chain course; and

the other drive shaft having the lift chain engaging sprocket mounted thereon engaging the drive chain along the lower chain course.

4,042,125

METHOD AND APPARATUS FOR STACKING AND FEEDING BLANKS TO A TIERED MULTI-OPENING PRESS FOR THE PRODUCTION OF PRESSED BOARD

Willard Falkinger, Farsta, and Per Anders Asberg, Taby, both of Sweden, assignors to Defibrator AB, Stockholm, Sweden

Filed Oct. 17, 1975, Ser. No. 623,534

Claims priority, application Sweden, Oct. 23, 1974, 74133422

Int. Cl.[2] B65G *65/02;* B30B *15/30*

U.S. Cl. 214—6 BA **8 Claims**

1. In a system for producing pressed board and the like, in which the board blanks are pressed in tiers in a multi-opening press, the method of stacking and feeding the board blanks comprising:

a. depositing the board blanks on platens;

b. successively transporting the platens and superposed board blanks by conveyor means into a stacking device at predetermined intervals;

c. raising a predetermined number of platens and superposed board blanks successively above the conveyor means into retained contact with one another to form a stacked assembly of platens and board blanks and

d. introducing said stacked assemblies into the tiered opening in the multi-opening press.

4,042,126

METHODS AND APPARATUS FOR RETRIEVAL OF STORED ARTICLES FROM A STACK

Lon Blauvelt, Niles, Mich.; J. Douglas Dickson, and Robert C. Russell, both of Columbus, Ohio, assignors to Simplicity Pattern Co. Inc., New York, N.Y.

Filed Feb. 26, 1976, Ser. No. 661,742

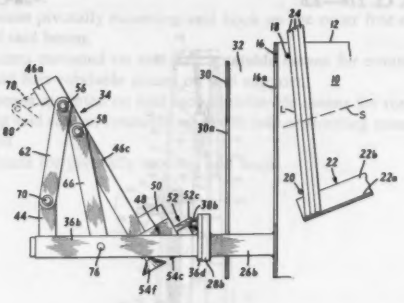
Int. Cl.[2] B65G *59/00*

U.S. Cl. 214—8.5 A **9 Claims**

3. A method for removing the lead article from a plurality of generally flat articles by use of a suction head comprising the steps of:

a. stacking said articles successively axially inwardly along a stacking axis and retaining said articles in such stack by imposing axial restraint upon first and second marginal portions of said lead article disposed transversely of said stacking axis;

b. preselecting a path for withdrawal from said stack of said lead article wherein said first portion thereof is free of such axial restraint;



c. disposing said head in suctional engagement with said lead article and displacing said lead article inwardly along said stacking axis to free said first portion thereof from said axial restraint and dispose said first portion in such preselected path; and

d. moving said head outwardly of said stack in such suctional engagement with said lead article in manner maintaining said lead article in said preselected path.

4,042,127

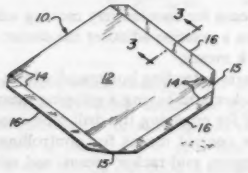
SLIP PALLET AND DIVIDER SHEET

Charles Edward Brossia, Lakewood, Colo., assignor to Adolph Coors Company, Golden, Colo.

Filed Oct. 30, 1975, Ser. No. 627,101

Int. Cl.[2] B65D *19/00*

U.S. Cl. 214—10.5 R **17 Claims**



1. Apparatus for transporting and stacking, by use of a support device of a lift truck, an array of containers in a predetermined configuration including aligned vertically extending side surfaces and vertically spaced horizontally extending upper and lower surfaces and comprising:

a pallet member made of one piece of relatively thin plastic sheet material,

an upwardly facing container support surface on said pallet member defined by opposite pairs of generally parallel edges thereon having a peripheral configuration generally corresponding to the lower surface of an array of containers to be located thereabove in supportive engagement therewith,

a downwardly facing support surface on said pallet member extending generally parallel to said upwardly facing container support surface and having a peripheralconfiguration generally corresponding to the peripheral configura-

tion of the upper surface of another array of containers to be located therebeneath,

an upwardly outwardly extending flap portion integral with said pallet member provided along at least one of said edges and being permanently formed in a generally upwardly outwardly extending postition relative to said upwardly facing container support surface to extend upwardly outwardly thereabove in space protective relationship to the adjacent side surface of the array of containers supported thereon while being resiliently deflectable relative to said upwardly outwardly extending position;

a divider member made of one piece of relatively thin plastic sheet material;

a downwardly facing support surface on said divider member defined by opposite generally parallel edges thereon having a peripheral configuration generally corresponding to the upper surface of an array of containers located therebeneath in supportive engagement therewith;

an upwardly facing support surface on said divider member extending generally parallel to said downwardly facing support surface and generally corresponding to the peripheral configuration of the lower surface of the array of containers thereabove for supportive engagement with the downwardly facing support surface on said pallet member;

a downwardly extending flap portion integral with said divider member provided along at least one of said edges corresponding in location to at least one of said edges of said pallet member having said upwardly outwardly extending flap portion thereon and being in a generally downwardly extending position relative to said downwardly facing support surface to extend downwardly therebelow in spaced protective relationship to the adjacent side surface of the other array of containers located therebelow; and

said upwardly outwardly extending flap portion on said pallet member and said downwardly extending flap portion of said divider member defining an outwardly diverging slot providing access for insertion of the support device of the lift truck in the space between said downwardly facing support surface on said pallet member and the upwardly facing surface on said divider member.

4,042,128

SUBSTRATE TRANSFER APPARATUS FOR A VACUUM COATING SYSTEM

Robert L. Shrader, Castro Valley, Calif., assignor to Airco, Inc., Montvale, N.J.

Filed Nov. 26, 1975, Ser. No. 635,475
Int. Cl.² C23C *13/08*
U.S. Cl. 214—17 B **11 Claims**

1. In vacuum processing apparatus of the in-line multiple chamber type including a process chamber located between a load-luck chamber and an unload-lock chamber, a transfer means for moving substrates between and through the chambers comprising:

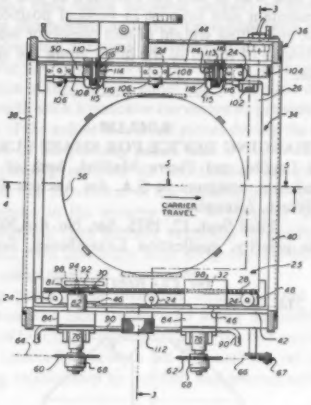
a. a carrier for holding substrates:

b. a plurality of rollers for supporting and laterally guiding a longitudinal edge of the carrier as it moves along a linear path through the chambers:

c. a plurality of variable speed rotary gears spaced along the linear path of the carrier for driving the carrier between and through the chambers;

d. a gear-rack integral with the carrier and extending along a longitudinal edge thereof for sequentially engaging the rotary driving gears, said gear-rack adapted for concurrent engagement by at least two driving gears; and

e. motive means for operating the rotary driving gears to allow selective acceleration of the carrier.

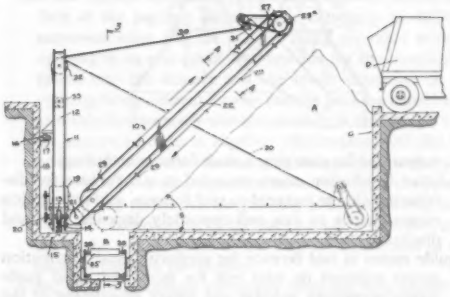


4,042,129

REFUSE RECLAIMING APPARATUS

Robert K. Hampton, 119 Somerset Ave., Garden City, N.Y. 11530

Filed May 17, 1976, Ser. No. 687,020
Int. Cl.² B65G *65/42*
U.S. Cl. 214—17 DB **7 Claims**



1. Apparatus for reclaiming refuse from a pile thereof confined within a generally rectangular area of substantial length and stored with the top surface thereof fully exposed comprising in combination a below-ground-level elongated storage bin defined along its opposite sides by a pair of vertically extending laterally spaced parallel walls and a bottom floor extending horizontally between said side walls, said bin being provided along one side wall thereof with an adjacent elongated depressed trench which extends substantially the full length of said bin and has an open top disposed substantially flush with the bottom floor of said bin, said trench being spaced inwardly of its adjacent side wall of said bin to provide the latter with a bottom wall portion extending laterally beyond the outer side of said trench, a first endless conveyor mechanism having a running section operative to drag refuse from the top of the stored refuse pile toward one side thereof and into said trench, a traveling support for said conveyor mechanism shiftable lengthwise along said laterally extended bottom wall portion of said bin, means for operatively mounting said conveyor mechanism on said traveling support for vertical movement thereof into a position substantially paralleling the angle of repose of the stored refuse pile for penetrating engagement with the refuse resting on the surface of said pile, means for effecting operation of said conveyor mechanism and shifting

movement of its said traveling support whereby to drag refuse from the surface of said pile as said conveyor scans the same, and coacting means interconnecting said traveling support and said one side wall of said bin outboard of said trench to constantly maintain said support in vertical position against the counteracting tilting weight of said conveyor mechanism during the course of travel of the latter along the surface of said refuse pile.

4,042,130

CHARGING DEVICE FOR SHAFT FURNACE

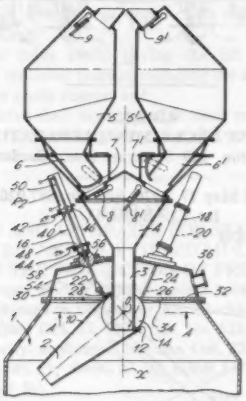
Edouard Legille, and Pierre Mailliet, both of Luxembourg, Luxembourg, assignors to S.A. des Anciens Etablissements Paul Wurth, Luxembourg

Filed Sept. 17, 1975, Ser. No. 614,307

Claims priority, application Luxembourg, Sept. 20, 1975, 70952

Int. Cl.² B66C *17/08*

U.S. Cl. 214—35 R **37 Claims**



1. Apparatus for charging a shaft furnace including:

tubular distribution means mounted in said furnace for distributing charge material to said furnace, said distribution means having an axis and oppositely disposed inlet and discharge ends;

guide means in said furnace for supporting said distribution means adjacent its inlet end for movement, said guide means permitting angular and rotary adjustment of the axis of said distribution means with respect to an axis of said furnace;

at least three control elements connected to said distribution means at spatially displaced points;

actuating means for longitudinally moving said control elements to direct the discharge of said distribution means to selected positions in said furnace; and

control means for independently regulating said actuating means in synchronism.

4,042,131

SWINGABLE BUCKET FOR EXCAVATORS

Frederic P. Buttke, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 7, 1975, Ser. No. 602,615

Int. Cl.² E02F *3/32*

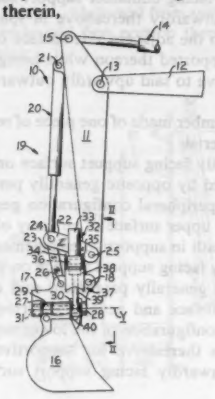
U.S. Cl. 214—138 R **4 Claims**

1. A dipper stick and bucket arrangement for an excavator comprising,

a normally vertically disposed dipper stick

a support bracket including spaced parallel upstanding plates having front and rear pin bores provided therein, and a depending portion having transverse pivot means provided therein, and wherein said front pin bores are pivotally connected to the distal end of the stick disposed intermediate said plates, said support bracket also including spaced parallel mounting plates extending from one of said upstanding plates on one side of said support bracket and having pivot bores provided in the distal ends thereof,

bucket means including spaced parallel mounting brackets provided on the top thereof each having front and rear pin bores provided therein,



bracket means pivotally mounted on said transverse pivot means and on said front and rear bracket pin bores and wherein said bracket means includes spaced parallel levers extending from one side thereof above the bucket intermediate the front and rear portions thereof, and

a hydraulic cylinder pivotally connected to said mounting plates and said levers whereby the bucket may be pivoted around said transverse axis upon actuation of said hydraulic cylinder.

4,042,132

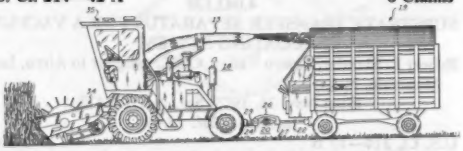
SPOUT CONTROL APPARATUS FOR AGRICULTURAL MACHINES

Carl E. Bohman, Sudbury; Hubert R. Durling, Jr., Lancaster; Leon Susman, Sudbury, and Norman F. Rolfe, Carlisle, all of Mass., assignors to Sperry Rand Corporation, New York, N.Y.

Filed June 1, 1976, Ser. No. 689,422

Int. Cl.² B65G *67/22*

U.S. Cl. 214—42 A **8 Claims**



1. Apparatus for automatically controlling the direction of a crop discharge spout on an agricultual machine with respect to a wagon attached thereto by means of a hitch assembly, said apparatus comprising:

first sensor means for providing a first sensor signal representative of the angle between the longitudinal axes of said agricultural machine and said wagon,

second sensor means for providing a second sensor signal representative of the angle between the directon of the crop discharge from said crop discharge spout and the longitudinal axis of said agricultural machine,

comparator means for comprising said first and second sensor signals and providing an error signal derived from the difference therebetween, and

utilization means coupled to said crop discharge spout and

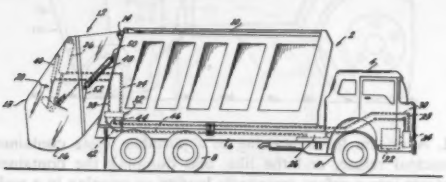
responsive to said error signal for adjusting the direction of the crop discharge from said crop discharge spout so that the discharged crop is continually directed into the wagon.

4,042,133

REFUSE COMPACTOR

Fred T. Smith, Newark, Ohio, assignor to Sargent Industries, Inc., Los Angeles, Calif.

Filed June 6, 1975, Ser. No. 584,299
Int. Cl.[2] B65F *3/00*
U.S. Cl. 214—83.3 **21 Claims**



1. In a refuse packer having a refuse storage body, a loading hopper and a passage leading from said hopper to said storage body at the forward end of the hopper, the improvement comprising:

collapsible packing means mounted in said hopper and including an upper packing panel and a lower packing panel freely pivotable relative to the upper packing panel between a collapsed position relative to the upper packing panel and an extended position relative to the upper packing panel;

said packing panel means being movable forwardly in the hopper from the collapsed position of the lower panel relative to the upper panel at the rear of the hopper to the extended condition of the lower panel relative to the upper panel to sweep refuse from said hopper into said passage;

said packing means being movable rearwardly from said passage to provide for the pivotal movement by the refuse in the hopper of the lower packing panel to said collapsed position relative to the upper packing panel;

said packing means in its partially collapsed condition being capable of moving over refuse in said hopper;

motive means drivingly connected to said upper packing panel to move the packing means forwardly and rearwardly in the hopper; and

guide means disposed on the lower packing panel in cooperative relationship with the hopper for producing a force on the lower packing panel relative to the upper packing panel during the movement of the packing means to provide for the pivotal movement of the lower packing panel from the collapsed position relative to the upper packing panel to the extended position relative to the upper packing panel during the forward movement of the panel means to sweep refuse through the passage into the storage body from the hopper.

4,042,134

REFUSE COLLECTION APPARATUS

Fred T. Smith, Dearborn Heights, Mich., assignor to Sargent Industries, Inc., Los Angeles, Calif.

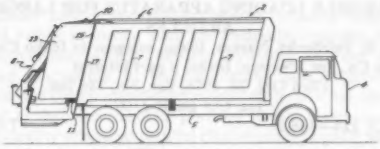
Continuation of Ser. No. 440,746, Feb. 18, 1974, abandoned.
This application Nov. 19, 1975, Ser. No. 633,553
Int. Cl.[2] B65F *3/00*
U.S. Cl. 214—83.3 **8 Claims**

1. In combination for use in packing refuse in a collection apparatus wherein the apparatus includes a hopper having a hollow configuration defined by a front surface and a pair of side surfaces spaced from each other,

a packing panel having a first surface for engaging the refuse in the hopper to pack the refuse in the hopper, the packing panel being movable initially forwardly in an arcuate path having a relatively large radius to define essentially a forward movement in the hopper to pack the refuse in the hopper and then being movable initially vertically upwardly in the hopper and then upwardly with progressively increasing forward components of movement to provide for the removal of the refuse from the hopper, the first surface of the packing panel being provided throughout its length with a concave curvature to provide for the breakage of the refuse into small pieces during the upward movement of the packing panel, and

means operatively coupled to the hopper for providing initially for the movement of the packing panel forwardly in the hopper in the arcuate path having the relatively large radius and then initially vertically upwardly in the hopper and then upwardly with progressively increasing forward components of movement,

the packing panel being provided with a second surface spaced from the first surface and being supported by a plurality of bracing members spaced from one another and disposed internally between the first and second surfaces in bracing relationship to the first and second surfaces,



the first surface extending outwardly from the second surface of the packing panel at one extremity to define a narrowed edge and the hopper being provided with an opening in its rear surface to provide for the insertion of refuse into the hopper and the lower extremity of the opening being defined by a lip and the packing panel being movable downwardly past the opening in the hopper with the narrowed edge in abutting relationship with the lip, prior to the forward movement of the panel in the hopper, to provide for a shearing of refuse overhanging the lip and the moving means for the packing panel providing for a downward movement of the packing panel past the opening in the hopper prior to the forward movement of the packing panel in the hopper,

a pair of ribs extending outwardly from the first surface of the hopper in spaced relationship to each other along the lateral dimension of the packing panel and the ribs extending along the curved configuration of the first surface and wherein the ribs are configured to converge toward the first surface.

4,042,135

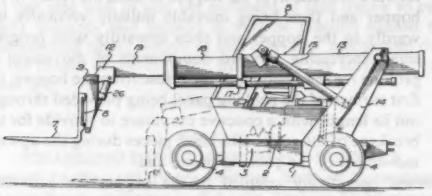
LOAD HANDLING VEHICLE

Stuart Pugh, Loughborough, and Ridley Stokoe, Whitley Bay, both of England, assignors to The Liner Concrete Machinery Company Limited, Gateshead, England

Filed Oct. 14, 1975, Ser. No. 622,359
Claims priority, application United Kingdom, Oct. 12, 1974, 44295/74
Int. Cl.[2] E02F *3/38*
U.S. Cl. 214—141 **6 Claims**

1. A load handling vehicle comprising: a chassis, axles carrying the chassis on wheels, a telescopically extensible boom pivotally mounted on said chassis, a jack between the chassis and said boom for raising the boom, a pin having strain gauges mounted thereon, said pin connecting the chassis to one of said

axles, wherein when a turning moment of the chassis exceeds a predetermined level, said strain gauges operate an audible



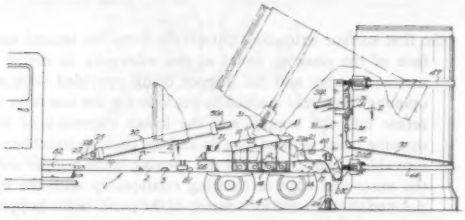
and/or visible alarm to warn of possible overload or unstable conditions.

4,042,136

MOBILE LOADING APPARATUS FOR LARGE ARTICLES

Philip R. Fairbanks, Nampa, Idaho, assignor to Idaho Concrete Pipe Co., Inc., Nampa, Idaho, a part interest

Filed Oct. 28, 1976, Ser. No. 736,746
Int. Cl.² B60P *1/00*
U.S. Cl. 214—146.5 **7 Claims**



1. In a vehicle for transporting articles of substantial mass, said vehicle including a frame and undercarriage, the improvement comprising,

a tiltable carriage movable between an upright loading-unloading position and a horizontal load transporting position, load securing means on said carriage,

a front pair of guideways with each guideway offset upwardly from a frame member of the vehicle, each guideway constituting an inclined pathway,

a rear pair of guideways supported by said frame members and each having angularly disposed segments with one segment thereof being downwardly and rearwardly inclined relative to the vehicle frame,

front and rear roller means on said carriage and respectively entrained for travel on said front and rear guideways and operable to confine the carrier for travel between upright and horizontal extreme positions, said rear roller means and the lower terminus of said rearwardly inclined guideway segments coacting to support the carriage for pivotal movement of the carriage about a fixed axis during tilting movement immediately prior and subsequent the carriage upright loading position, remaining carriage travel being determined by the travel of said front roller means along the inclined pathways of the front guideways and the travel of said rear roller means along the angularly disposed segments of said rear pair of guideways, and

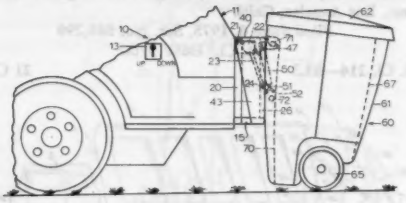
powered means carried by the vehicle and acting on the carriage throughout both arcuate travel of same about said fixed axis and coterminous travel along said guideways.

4,042,137

MUNICIPAL REFUSE COLLECTION SYSTEM

Thomas Philip Hughes, 803 Quail Court, Roanoke Rapids, N.C. 27870, and Clark Alexander Sherrill, 2811 Bleeker Square, Apt. H, Winston-Salem, N.C. 27106

Filed Apr. 8, 1976, Ser. No. 674,871
Int. Cl.² B65F *3/02*
U.S. Cl. 214—302 **8 Claims**



1. A system for containing in a portable waste container municipal refuse, and the like, and dumping the container contents into a refuse receptacle having an opening in a wall portion thereof, comprising in combination:

a. a portable container having upper and lower vertically-spaced horizontal locking bars on a selected side surface thereof;

b. a dumping mechanism on said refuse receptacle adjacent said opening and comprising:

i. a support frame secured to said receptacle and mounting reversible motor means and an elongated lift arm, said motor means being arranged to pivot said lift arm about a fixed horizontal axis extending through an inner end thereof adjacent said frame, said lift arm having track traveler means at an opposite outer end portion thereof adapted for riding in a cooperative track;

ii. a lift platform having a plate member providing an outer surface for engaging a portion of said selected side surface of said container and having an upper portion thereof pivotally secured to said frame for pivoting on said frame about a fixed horizontal axis, said platform plate member having track means on an inner surface thereof facing said frame for receiving said lift arm track traveler means enabling said platform plate member to be pivoted on said frame in correspondence with pivoting of said lift arm by said motor means;

iii. a fixed upper hook member secured to said outer surface of said platform plate member and adapted for engaging said container upper bar and supporting said container thereon;

iv. a fluid actuated piston-cylinder unit having a housing portion fixedly secured to the inner surface of said platform plate member and having a linearly movable piston rod associated therewith, said piston rod being downwardly angled and mounting on its outer extremity a lower hook member oriented to engage said container lower bar at selected times dependent upon actuation of said piston-cylinder unit; and

v. actuator means fixed to said frame and connected to an appropriate fluid source for said piston-cylinder unit and including control means governed by operation of said motor means, said motor means including a driven cam member and said actuator means including a cam follower member actuated by said cam member to control operation of said actuator means and thereby control actuation of said piston-cylinder unit in accordance with the positioning of said cam member, said actuator means being adapted to connect said fluid source to actuate said piston-cylinder unit in such manner that said piston-cylinder actuated lower hook is caused to positively and continuously engage said container lower bar and thereby rigidly secure said container to said platform at all times when the base of said container resides some predetermined distance above

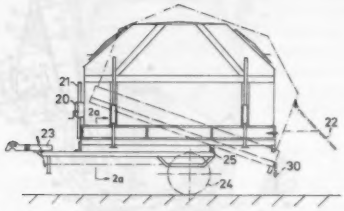
the ground and during which said container is being positioned between selected ground loading and elevated tilted dumping positions.

4,042,138

GARBAGE CONTAINER CARRIER

Jens Arne Krister Arvidsson, Illervagen 4 B, S-612 00 Finspang, Sweden

Filed June 28, 1976, Ser. No. 700,350
Int. Cl.[2] B65G *65/04*
U.S. Cl. 214—314 **4 Claims**



1. Transportable refuse container which is removably mounted on a two-wheel trailer provided with a dumping body which can be tipped in relation to the chassis of said trailer and a towbar intended to be coupled to a towing vehicle, the rear end of the container being provided with a door which makes it possible to empty the container by tipping it in a backwards direction, said container being provided with a forward pair and rear pair of supporting legs which can be raised and lowered and locked in vertical guiding sleeves attached to the sides of the container so that the legs can be adjusted to a length to support the container at a free height above the dumping body when the trailer is to be positioned under or removed from under the container, characterized in that the dumping body has sides, the rear side being movable from a blocking to a non-blocking position relative to said container door to permit opening of the container door, said container being held by the sides against movement on the dumping body, said guiding sleeves for the legs being supported by brackets, the inner end of each said bracket being attached to the container and mounted above the upper edge of the underlying side of the dumping body and supporting the sleeve in a position beyond said side, said legs having foot plates engaging the underside of the dumping body when the legs are adjusted and locked in an upper position to secure the container to the dumping body, the forward end of the container capable of being lifted by means of a jack which is mounted between the forward end of the container and the chassis of the trailer so that the backward tipping of the container can be effected during simultaneous tipping of the dumping body.

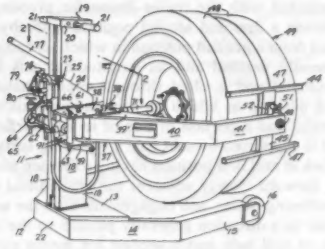
4,042,139

VEHICLE WHEEL-REMOVING AND HANDLING DEVICE

Harold R. Pernsteiner, Rte. No. 2, and Ernest H. Streckert, Rte. No. 3, both of Medford, Wis. 54451

Filed May 9, 1975, Ser. No. 575,959
Int. Cl.[2] B60B *29/00*
U.S. Cl. 214—331 **9 Claims**

1. A wheel-removing and handling device comprising a movable base, an upstanding post member on the rear portion of said base, carriage means slidably engaged on said post member, vertically-acting hydraulic cylinder means operatively connected between said base and said carriage means to adjust said carriage means vertically on said post member, a first horizontal clamping arm secured to one side of said carriage means, a second horizontal clamping arm pivoted on a vertical axis to the other side of said carriage means, said clamping arms having forwardly extending gripping portions provided with wheel-engaging means, horizontally acting clamping hydraulic cylinder means operatively connecting said second clamping arm to said carriage means, horizontally-acting wheel puller hydraulic cylinder means secured to the carriage means and extending forwardly between the clamping arms, hydraulic pump means on the carriage means, and conduit means operatively connecting said hydraulic pump means to the respective hydraulic cylinder means, said conduit means including respective control valves in circuit with the hydraulic cylinder means, said conduit means including respective control valves in circuit with the hydraulic cylinder means, said horizontally acting clamping hydraulic cylinder means disposed rearwardly of said upstanding post member and wherein said clamp members comprise respective bar elements pivoted at their intermediate portions to said clamping arms, and a plurality of spaced parallel cleat members rigidly secured to each bar element and adapted to transversely clampingly engage on a tire tread.

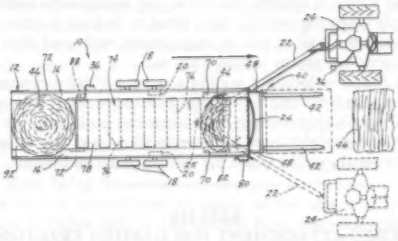


4,042,140

SELF-LOADING AND UNLOADING HAY BALE TRAILER

Douglas F. McFarland, Davis City, Iowa, assignor to Farmhand, Inc., Hopkins, Minn.

Continuation of Ser. No. 464,449, April 26, 1974. This application Aug. 13, 1975, Ser. No. 604,252
Int. Cl.[2] B60P *1/38*
U.S. Cl. 214—518 **9 Claims**



1. A bale trailer for loading bales of a size generally incapable of being handled and maneuvered by a single person onto the trailer at its forward end to a load position, conveying said bales along the trailer to a transport position and transporting said bales to a desired location, each of said bales having a longitudinal axis and a pair of end surfaces, said end surfaces having a transverse dimension and being generally parallel to each other and generally perpendicular to the longitudinal axis, said trailer comprising:

an elongated frame having front and rear ends and defining a generally horizontal bale supporting surface adapted for supporting a bale both while it is being conveyed from its load position to its transport position and while it is being transported to a desired location, the total width of said

elongated frame being generally no greater than approximately the transverse dimension of said bale such that said bale supporting surface is adapted to support a single row of bales positioned side by side along the centerline of said elongated frame;

an L-shaped bale handling fork pivotally connected to said frame about a generally horizontal axis at said front end and being positioned on the centerline of said frame;

power means independent of the movement of said bale trailer comprising collapsible means having one end pivotally attached to said fork and the other end pivotally connected with the trailer frame for pivoting said fork between a first and second position whereby the bale is lifted from a ground position in which its end surfaces are generally vertical and its longitudinal axis is generally horizontal and is tilted through approximately 90° to a load position in which its longitudinal axis is generally vertical and a portion of one of its end surfaces engages and is supported by said bale supporting surface;

said fork in said first position having a first leg means extending forward closely adjacent the ground and adapted for positioning under, and engagement with the underside of, a bale in a direction generally parallel to the longitudinal axis of said bale and a second leg means extending upwardly at approximately right angles to said first leg and defining a bale supporting portion positioned generally at right angles to said first leg means, wherein said bale supporting portion is adapted for engagement with one of the end surfaces of said bale throughout a substantial portion of said bale supporting portion and maintaining such engagement during the lifting of a bale from its ground position to its load position;

said fork in said second position having said first leg means extending vertically upwardly and said second leg means extending rearwardly at approximately right angles to said first leg and lying substantially in the plane of said bale supporting surface;

conveying means generally centrally disposed relative to said elongated frame, extending longitudinally of said frame at generally right angles with respect to the horizontal axis of said fork and having its front end positioned directly to the rear of said bale handling fork for engaging the bale and moving it between its load position and a selected transport position along the centerline of said frame, said conveying means further being disposed relative to said fork such that the forward end of said conveying means is adapted for conveying engagement with the bale when the bale has been lifted to its load position and while the bale is still in engagement with said first end second leg means of said fork; and

said frame including a pulling tongue pivotally connected near the front end thereof and adapted to pivot between a straight-ahead position and at least one position to the side of said straight-ahead position to allow said fork to move forwardly under a bale for loading onto said frame.

4,042,141

BUCKET ATTACHMENT FOR GARDEN TRACTORS

James R. Schweigert, 4696 Flag Ave. North, Minneapolis, Minn. 55428

Filed Apr. 28, 1976, Ser. No. 681,185
Int. Cl.[2] E02F *3/62*
U.S. Cl. 214—766 **5 Claims**

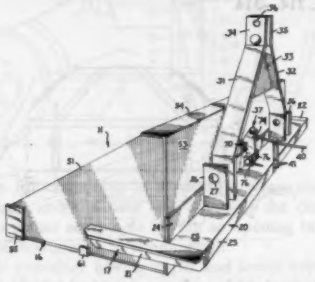
1. A scoop attachment, adapted to be connected to the lifting hitch of a power vehicle, comprising, in combination:

a scoop for loading, lifting, transporting, and dumping materials, having a closed back, closed ends, and a stop finger secured to the outer surface of said back between said ends, said finger including lower and rear stop faces and an upper latching face;

a frame, including a cross member, rigid means projecting from said cross member in a first direction and including coupling means for receiving the hitch of the vehicle, and a pair of arms projecting from said cross member in a second direction toward said scoop;

means movably connecting the ends of said scoop to said arms for pivotal movement therebetween;

means rigid with said cross member and positioned to engage said stop faces of said stop finger in a predetermined pivoted position of said finger and said scoop in said frame, to limit said pivotal movement in a first sense and to prevent translational movement of said finger in a direction towards said frame;



a latching blade resiliently pivoted to said frame for automatically and releasably engaging said latching surface of said stop finger in said predetermined position thereof, to prevent said pivotal movement in a second sense opposite to said first sense;

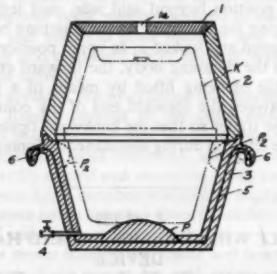
and manually operable means for pivotally releasing said latching blade from engagement wit said finger, to thereby enable pivotal movement of said scoop in said second sense.

4,042,142

BEER KEG COOLING CONTAINER

Robert W. Ruano, 2711 Locust Drive, Pittsburgh, Pa. 15241

Filed Apr. 30, 1976, Ser. No. 682,050
Int. Cl.[2] B65D *7/24;* A47J *27/10*
U.S. Cl. 220—4 B **5 Claims**



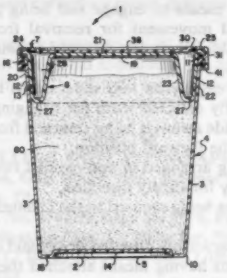
1. A container assembly for keeping cool a keg containing beer or other liquid, comprising a barrel shaped keg having outer walls, a container comprising a bottom half of insulating material reinforced with a basket-like reinforcing material and in the shape of a tub, a top half of insulating material generally of the shape of an inverted tub and made in two parts including a detachable lid with a central opening through which a tap of said keg is projected, said top and bottom halves having mating mouth portions which readily and detachably fit together, said container being spaced from said outer walls of the keg for receiving ice therebetween, and handle portions on diametrically opposite sides of said basket-like reinforcing material for carrying said container and keg.

4,042,143

DOUBLE SEAL CONTAINER

Robert B. Biggins, 4230 Wiedenmann Place, Kansas City, Mo. 64111

Filed Mar. 29, 1976, Ser. No. 671,622
Int. Cl.[2] B65D *51/18, 41/16*
U.S. Cl. 220—256 3 Claims



1. A container comprising:

a. a base with upstanding side walls attached thereto forming a wide-mouthed receptacle for receiving perishable contents therein, said side walls having an upper free edge which defines a container opening and includes a seat portion disposed adjacent to said free edge, said seat portion having a smooth inner surface which tapers inwardly from said free edge;

b. a removable snap-fitting closure engaging the upper free edge of said receptacle and closing said opening to form a first container seal about said free edge, said closure being imperforate;

c. a seal plug having a smooth outer surface with a tapered shape for cooperating contact with said seat portion and being removably positioned within said receptacle, the outer surface of said seal plug and the inner surface of said seat portion cooperatively abutting each other during use to form a second container seal between said surfaces;

d. said closure engaging said seal plug and retaining the same in a sealed position in the receptacle seat portion;

e. said receptacle side walls include a first bead formed on an outside surface thereof at a point positioned adjacent to said free edge;

f. said closure includes a top portion and a flange portion depending substantially normally therefrom and integrally connected therewith;

g. said flange includes a second bead formed integrally around an interior surface thereof, said second bead engaging said first bead and removably connecting said closure and said receptacle;

h. said seal plug includes a base with upstanding side walls attached thereto, said seal plug side walls having an upper end edge abutting an interior surface of the closure top portion along a line disposed adjacent to said flange whereby said closure wedgingly urges said seal plug snugly into said seat portion and retains the same therein; and

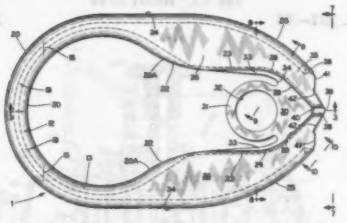
i. said seal plug base has a medial portion thereof in abutting contact with and supporting a medial portion of said closure to improve container packing and stacking efficiency.

4,042,144

PULL TAB CONSTRUCTION FOR FULL PANEL PULL-OUT ENDS FOR EASY OPENING CANS

George J. Henning, Canton; Lynn B. McKinney, and Joseph Scalia, both of Massillon, all of Ohio, assignors to Van Dorn Company, Cleveland, Ohio

Filed Nov. 10, 1976, Ser. No. 740,373
Int. Cl.[2] B65D *41/32*
U.S. Cl. 220—273 17 Claims



1. A sheet metal pull tab for a full panel pull-out easy opening metal can including, flat top and rounded outer side walls forming a tab perimetric contour defined by spaced curved tab ring and nose ends connected by parallel tab sides; the flat tab top wall having an inner side wall defining a keyhole-shaped slot; the contour of the keyhole slot including a curved ring portion at the curved tab ring end connected by reversely curved portions to parallel portions extending toward the tab nose end; the rounded outer tab side wall having an inturned bead-forming flange extending around the tab perimeter ring end, parallel sides, and portions of the curved nose end, and ending in spaced bead terminals; the curved tab ring portion inner side wall being rounded and having an inturned bead-forming flange at the ring end, said last-mentioned bead-forming flange terminating at the reversely curved portion connections with said parallel keyhole portions; the inner keyhole slot side wall parallel portions being connected adjacent the tab nose end by portions curved inwardly toward the nose end; said last-mentioned inward curved inner side wall portions being connected with straight wall portions angled at 90° toward each other; the angled straight wall portions at the tab nose end extending downward from the flat tab top wall to and being connected with a generally right triangularly-shaped flat nose bottom wall; the parallel, inwardly curved, and straight angled tab inner side wall portions extending vertically downward from the flat tab top wall and vertically with respect to said flat nose bottom wall; the flat tab top wall at the tab nose end and the 90° angled straight tab inner side wall portions merging in a generally rectangular flat nose tip offset upward from the nose bottom wall in the zone of the projected intersection of the angled straight vertically oriented tab inner side wall portions; an ear extending rearward from the nose bottom wall; there being rivet-receiving aperture means formed in the ear; a narrow tapered side extension of the nose bottom wall located at either side of and spaced from the ear projecting toward the ear from the lower ends of the parallel keyhole vertical side wall portions; the narrow tapered side extensions terminating rearward of the nose bottom wall where the reversely curved inner side wall portions merge with the keyhole parallel inner side wall portions; there being curved slots formed between the ear and tapered side extensions; the curved slots having terminal zones located at hypotenuse corners of the right triangular nose bottom wall; the nose bottom wall right-angled corner being located adjacent the rectangular nose tip; the flat tab top wall having maximum width between adjacent parallel outer side and inner keyhole walls laterally of a tab centerline passing through the nose tip and rivet-receiving aperture means; and the flat tab top wall having a nose portion between each bead terminal and a straight angled nose wall portion whose width is approximately ½ the maximum top wall width measured on a line

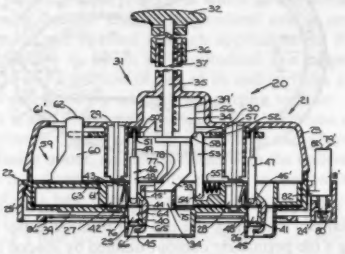
extending radially of the center of the rivet-receiving aperture means.

4,042,145

SENSITIVITY DISC DISPENSER WITH TAMPER MECHANISM

Stephen Jeffrey Ehrlich, Randallstown, Md., assignor to Becton, Dickinson and Company, East Rutherford, N.J.

Filed Nov. 3, 1975, Ser. No. 628,077
Int. Cl.² B65H *3/44*
U.S. Cl. 221—94 **23 Claims**



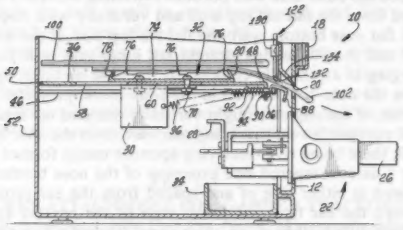
1. A sensitivity disc dispenser comprising; a dispensing structure for housing a plurality of disc containing cartridges and having means for simultaneously dispensing a disc from each cartridge through each one of a selected number of discharge ports containing a cartridge in a predetermined pattern, including means for positioning a disc from each cartridge into alignment with the discharge port, tamping means for expelling the discs through the respective discharge ports into a receiving dish and means for permitting dispensing through a selected number of ports less than the total number of ports.

4,042,146

MAP VENDING MACHINE

Jack W. Nutter, 7500 W. Eightieth St., Los Angeles, Calif. 90045

Filed Mar. 15, 1976, Ser. No. 667,124
Int. Cl.² B65G *59/06*
U.S. Cl. 221—152 **6 Claims**



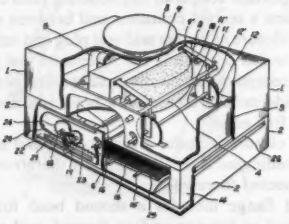
1. In a machine for vending folded paper items,
a housing having forward and rear walls,
a channel-shaped chute supported within said housing,
said chute being adapted to contain said items for vending, said chute having a bottom and said items being adapted to extend upwardly from adjacent the bottom of the chute,
slide means adjacent the bottom of said chute and associated therewith to support said items, said slide means being adapted to slide forwardly and rearwardly relative to said chute and having means to engage one of said items for sliding forward movement therewith,
an exit slot in the forward wall of said housing to permit the removal of one of said items as the result of said forward sliding movement,
drive means in said housing to slide said slide means rearwardly in said housing from a forward position to a rearward position,
the improvement comprising:
biasing means associated with said chute and said slide means to return said slide means from the rearward position to the forward position, said one item being engaged for said forward movement adjacent said rearward position by said means to engage and being positioned after said forward movement for removal from the housing when said slide means has returned to said forward position,
said means to engage on said slide means being upwardly and forwardly directed teeth for engaging said one item while said slide means is being returned from the rearward position to the forward position,
said teeth being arranged in non-parallel rows extending in the generally forwardly direction,
said slide means being secured to the channel bottom of said chute,
a forwardly-rearwardly directed slot in said channel bottom,
said slide means having means attached thereto adapted to slide in said slot, and
a tang extending downwardly from said slide means below said bottom for driving engagement by said drive means,
said drive means being secured to said forward wall and being adapted to drive in the rearward direction,
said drive means having a handle exteriorly of said housing and being adapted to be manually moved in the forward and rearward directions by said handle,
said forward wall being hinged to said housing for opening and closing said housing,
said drive means being moved out of said housing when said wall is moved on the hinge to open the housing,
said chute being accessible for filling with said items when said housing is opened.

4,042,147

TISSUE PAPER TAKE-OUT DEVICE

Young Yee Lee, 156-37, Nockbun-dong, Soudaemun, Seoul, South Korea

Continuation-in-part of Ser. No. 559,207, March 17, 1975, abandoned. This application Sept. 29, 1976, Ser. No. 727,749
Int. Cl.² B65H *5/00*
U.S. Cl. 221—225 **3 Claims**



1. Apparatus for removing the uppermost tissue from a stack of tissues comprising:
a. an upper and lower case forming a housing having an outlet slot for the tissues;
b. a movable support plate supported within said lower case upon which the tissues are stacked;
c. a deformable air chamber located in said upper case;
d. manually operable deforming means extending through said upper case for deforming said deformable air chamber;
e. nozzle means connected to said deformable air chamber and extending into said lower case adjacent said stack of

tissues so as to direct air expelled from said air chamber upon its deformation onto the uppermost tissue of said stack;

f. pushing means bearing against the exposed surface of the uppermost tissue of said stack and movable with respect to said upper case so as to push said uppermost tissue toward said outlet slot;

g. connecting means connecting said pushing means to said manually operable deforming means such that said pushing means pushes said uppermost tissue toward said outlet slot when said deforming means deforms said air chamber; and

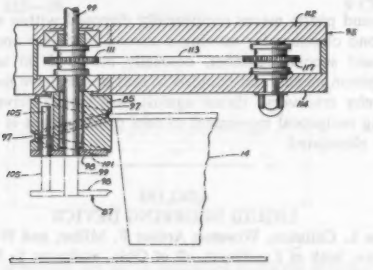
h. height adjusting means to adjust the height of said movable support plate so as to maintain the uppermost tissue of said stack in alignment with said outlet slot.

4,042,148

CUP FILLING AND CAPPING APPARATUS

Ralph D. Gerben, Glen Burnie, Md., assignor to Solo Cup Company, Urbana, Ill.

Division of Ser. No. 470,379, May 16, 1974, Pat. No. 3,965,656.
This application Mar. 17, 1976, Ser. No. 667,649
Int. Cl.[2] B65G *59/10, 59/06, 33/06, 33/38*
U.S. Cl. 221—222 **4 Claims**



1. In an apparatus for positively dispensing cups each having a rim and an upper end thereon, the combination comprising means for receiving a vertical stack of nested cups for discharge from an opening in said means, a plurality of dispensing gears disposed about said opening and each having spiral grooves therein for receiving the rims of the cups to lower the cup rims with turning of said dispensing gears, said dispensing gears having lower ends thereon, means for rotating said dispensing gears to successively lower a cup rim, cup stripper means at the lower ends of said cup dispensing gears and rotatable therewith to strip cups from the stack and having portions thereof for engaging said cup rims leaving said spiral grooves, said cup stripper means including means for reciprocating said portions engaging said cup rims relative to said dispensing gears and for forcing said cups downwardly with downward movement of said cup stripping means, said portions of said cup stripping means each having a groove therein aligned with a spiral groove in an associated dispensing gear to receive the cup rim, and means maintaining said alignment of said grooves on said portions and said gears during the rotation thereof and during reciprocation of one relative to the other.

4,042,149

LIQUID PUMP AND METERING SYSTEM

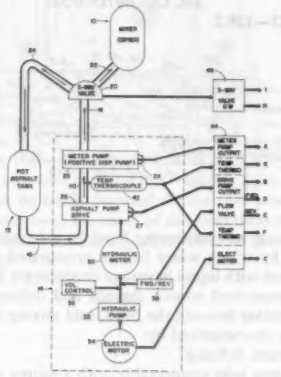
Don R. Main, Broken Arrow, Okla., assignor to Combotronics, Inc., Tulsa, Okla.

Filed June 23, 1975, Ser. No. 589,461
Int. Cl.[2] B67D *5/32*
U.S. Cl. 222—40 **14 Claims**

1. A liquid pumping and metering system comprising:

a. a first positive displacement pump having a rotatable portion, an inlet port and an outlet port, said inlet port being connected to a liquid source;

b. a second positive displacement pump having a rotatable portion responsive only to viscous liquid flow, an inlet port and an outlet port, said outlet port being connected directly to the outlet port of the first pump, whereby liquid from the first pump may be flowed through the second pump in a reverse direction;



c. a rotational power source operably connected to the rotatable portion of the first pump for pumping liquid through said first pump and into the outlet portion of the second pump;

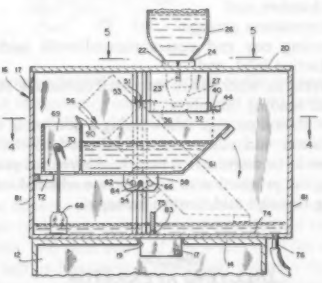
d. meter means operably connected to the rotating portion of the second pump for measuring the flow of liquid through said second pump, said flow of liquid causing rotation of the rotatable portion of said second pump.

4,042,150

WATER GRAVITY PLANT FEEDER

Hans Walter Roos, 235 Mount Hope Place, Bronx, N.Y. 10457

Filed Mar. 31, 1976, Ser. No. 672,299
Int. Cl.[2] A01G *27/00*
U.S. Cl. 222—70 **7 Claims**



1. A water gravity plant feeder comprising a housing, including a base having a front, side and a back side, a water container mounted on top of said housing, said top having an aperture for inserting said threaded neck therethrough, a water tray adjustably mounted in said housing beneath said aperture, a trough swingably mounted in said housing below said water tray, means in said water tray for delivering water in predetermined amounts to said trough, a sump positioned below said trough, said trough being tiltable to deliver water to said sump when a predetermined volume of water is reached in said

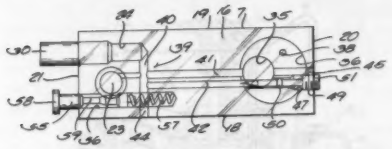
trough, causing said trough to tilt by gravity first water distributing means for watering plants, secured to said front side and second water distributing means for watering plants, secured to said back side.

4,042,151

BEVERAGE MIXING AND DISPENSING MACHINE

Raymond Uttech, Watertown, Wis., assignor to KARMA division of BRANDT, Inc., Watertown, Wis.

Filed May 13, 1976, Ser. No. 686,149
Int. Cl.[2] B67D *5/56*
U.S. Cl. 222—129.2 **15 Claims**



1. A mixing and dispensing head for a beverage dispensing apparatus, by which water from a pressurized source thereof can be mixed with liquid beverage concentrate from a substantially unpressurized source thereof and delivered to a consumer container beneath the head, said mixing and dispensing head being characterized by:

A. structure defining

1. a water inlet connectable with a source of water under pressure,
2. a concentrate inlet connectable with a source of beverage concentrate, and
3. a holding chamber having a downwardly opening outlet;

B. aspirator means defining

1. a venturi passage having an inlet communicated with said water inlet and an outlet communicated with said holding chamber, and
2. first and second eduction inlets opening into said venturi passage and from which fluid can be drawn into said venturi passage in consequence of flow of water therethrough; and

C. passage defining means providing

1. a concentrate passage communicating said concentrate inlet with said first eduction inlet to enable concentrate to be educted into a stream of water flowing through the venturi passage and carried therewith into the holding chamber, and
2. a recirculation passage
   a. having one end communicated with said second eduction inlet, and
   b. having its other end in restricted communication with said holding chamber,

said recirculation passage thus causing a portion of the combined water and concentrate conducted to the holding chamber to be recirculated back to the venturi passage for limiting the proportion of concentrate educted into water flowing through said venturi passage.

4,042,152

DILUTING APPARATUS

Vladimir J. Drbal, Miramar, Fla., assignor to Coulter Electronics, Inc., Hialeah, Fla.

Filed Nov. 21, 1975, Ser. No. 634,129
Int. Cl.[2] B67D *5/52*; G01N *1/14*
U.S. Cl. 222—137 **11 Claims**

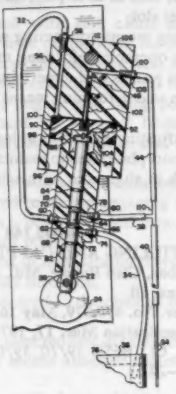
1. A diluting apparatus comprising:

at least a first chamber;

first piston means reciprocally disposed within said first chamber for moving a first fluid into and out of said chamber;

piston drive means for reciprocating said first piston means including valve means coupled at least to said first chamber for providing valving to said first chamber as said first piston means reciprocates;

at least a second chamber disposed coaxial with said first chamber; and



second piston means reciprocally disposed within said second chamber for moving a second fluid into and out of said second chamber, coaxially mounted on said first piston means, and coupled to said piston drive means;

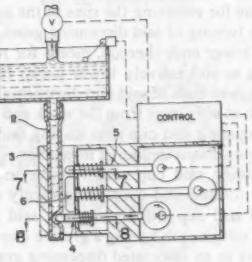
whereby transverse thrust against said piston drive means during reciprocal movement of said piston means is substantially eliminated.

4,042,153

LIQUID DROPPING DEVICE

James L. Callahan, Wooster; Arthur F. Miller, and Wilfrid G. Shaw, both of Lyndhurst, all of Ohio, assignors to Standard Oil Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 341,179, March 14, 1973, abandoned. This application Nov. 17, 1975, Ser. No. 632,536
Int. Cl.[2] B65D *37/00*
U.S. Cl. 222—207 **3 Claims**



1. A dropping device for forming uniform droplets of a liquid comprising:

a liquid reservoir;

a resilient tube having a substantially circular cross-section in respose and one end connected to said liquid reservoir in such manner that liquid from the liquid reservoir can flow through the resilient tube and out of a second end, said second end being in a vertical position and being capable of retaining liquid within said tube, and producing a uniform and distinct drop when force is asserted on the outer surface of said resilient tube;

a first valve which is located toward the second end of said resilient tube and being capable of restricting the flow of

liquid through the resilient tube by action on the outer surface of said resilient tube in a closed position and allowing flow of liquid through the resilient tube in an open position;

a second valve located along the resilient tube between said first valve and said liquid reservoir and being capable of restricting the flow of liquid through the resilient tube by action on the outer surface of said resilient tube in a closed position and allowing flow of liquid through said resilient tube in an open position; and

a plunger located between said first valve and said second valve, said plunger being capable of applying force on the outer surface of the resilient tube when said second valve is in the closed position and said first valve is in the open position, whereby a uniform and distinct drop is produced from said second end of the resilient tube.

2. The process of forming droplets from a slurry consisting of a suspending liquid and small particles suspended in the liquid comprising:

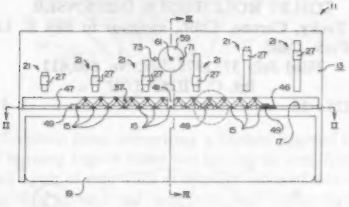
using as the dropping device the device of claim **1.**

4,042,154

DRAPERY MARKING APPARATUS

Jack M. Lawson, 3161 Ashwood, No. 3, Memphis, Tenn. 38118

Filed Oct. 4, 1976, Ser. No. 729,103
Int. Cl.[2] A41H *43/00*
U.S. Cl. 223—28 **9 Claims**



1. An apparatus for use in mounting fold-type drapery supports to a drapery panel, said apparatus comprising:

a. a frame;

b. a plurality of indicator means movably supported adjacent said frame for indicating where the fold-type drapery supports should be mounted on the drapery panel;

c. computing means mounted on said frame for determining the required distance between each adjacent fold-type drapery support for a given hemmed width size of a drapery panel to obtain a desired number of folds; and

d. adjustment means for uniformly moving said plurality of indicator means to allow the distance between each adjacent indicator means to be uniformly varied, said adjustment means being mounted to said frame, each of said plurality of indicator means being mounted on said adjustment means, said adjustment means including a cam means mounted to said frame and including a lazy tong means fixedly mounted to said frame, said cam means including a cam member and a cam follower member, said cam follower member being operatively coupled to said lazy tong means for selectively extending and contracting said lazy tong means in response to the movement of said cam member.

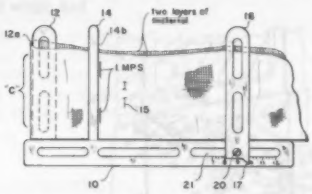
4,042,155

FABRIC PLEATER GUIDE INCLUDING A PLEAT FORMER

Edmund Jay Sprong, 38 Lockwood Lane, Riverside, Conn. 06878

Continuation-in-part of Ser. No. 638,530, Dec. 8, 1975, abandoned. This application May 17, 1976, Ser. No. 687,357
Int. Cl.[2] A41H *43/00*; D05B *35/08*
U.S. Cl. 223—34 **12 Claims**

1. A fabric pleater guide and pleat former for a pinch pleat comprising a base member having a calibrated measuring scale thereon, a fixed broad finger extending substantially perpendicular to said base member, an adjustable finger provided with an index part co-acting with said measuring scale whereby a length of fabric is doubled and the middle line thereof placed around an outer edge of one of said fingers and the cloth spread out, means for marking the placement of



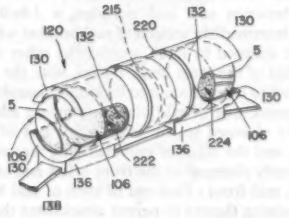
spaced primary pleat loops on said fabric and setting up the placement thereof, said pleat former being of such a size and dimension as to be freely inserted within said primary pleat loop and centered over the seam of the loop thereby dividing said loop into three substantially equal folds to thereby create said pinch pleat.

4,042,156

TENNIS BALL HOLDER

Lynn E. Knight, 3726 Broderick St., San Francisco, Calif. 94123

Continuation-in-part of Ser. No. 528,005, Nov. 29, 1974, abandoned. This application Jan. 30, 1976, Ser. No. 653,700
Int. Cl.[2] B65D *85/00*
U.S. Cl. 224—5 D **7 Claims**



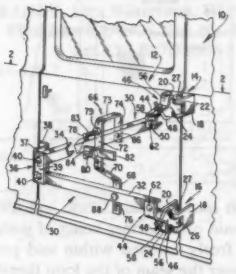
1. A carrier adapted to be attached to the person of a tennis player for temporarily enclosing at least one tennis ball, comprising: a generally rigid cylinder terminating in at least one open end, said open end having a pair of diametrically generally rigid protrusions each extending inwardly about a portion of the circumference of said cylinder to define a chamber with a circular opening therefrom less than the diameter of a tennis ball; a pair of diametrically opposed slots formed between said protrusions, said slots being of less width than the diameter of a tennis ball and extending along said cylinder to a location spaced from said opening by a distance sufficient to permit digital access to the back side of an enclosed ball; means for biasing said ball against said protrusions; and means for attaching said device to the person of said player, whereby a tennis ball temporarily enclosed by said can be removed therefrom such as by said player inserting a finger and thumb through said slots against the back side of said enclosed ball with sufficient force to the surface of said ball to cause said ball to be temporarily deformed without appreciable deformation of said protrusions so as to pass in an axial direction beyond said protrusions and be free of said chamber.

4,042,157

WHEEL AND TIRE CARRIER FOR ATTACHMENT TO MOTOR VEHICLE DOOR

Raywood C. Weiler, 17586 Vine St., Fontana, Calif. 92335

Filed May 14, 1975, Ser. No. 577,403
Int. Cl.² B62D *43/02*
U.S. Cl. 224—42.21 **5 Claims**



1. A wheel and tire carrier for attachment to the door of a motor vehicle in which the door is hingedly supported adjacent its hinged edge by upper and lower hinge means, with each of said hinge means having a front end offset outwardly of the front plane of the door, said wheel and tire carrier comprising a pair of substantially co-planar support members, each connected at their one end to the door adjacent to the opposite free edge thereof for limited pivotal adjustment, and diverging therefrom towards said upper and lower hinge means, independent and separated clamping means, adapted for readily attachable and detachable connection at each of said hinge means, affixed to the opposite end of each of said support members, each of said clamping means comprising a bracket having a substantially vertical end portion pivotally joined to said last mentioned end of each support member, a hook at an opposite end portion; which is adapted to hook around one edge of the front offset end of the hinge means, and an inclined intermediate section between said end portions, a J-bolt extending through said intermediate section of said bracket with the hook of said J-bolt adapted to hook around the other edge of the front offset end of the same hinge means, with the stem of the J-bolt threaded to receive a nut to lock said clamping means to said hinge means, one of said clamping means adapted to be independently clamped to the front offset end of said upper hinge means, and the other of said clamping means adapted to be independently clamped to the front offset end of said lower hinge means, said front offset end of each of said hinge means having no opening therein to permit attachment thereto, and a bracket means connected to said support members at intermediate points thereof and extending from one support member to the other support member for attachment of a tire wheel thereto, and one of said connections being adjustable to accommodate a variable spacing between said support members.

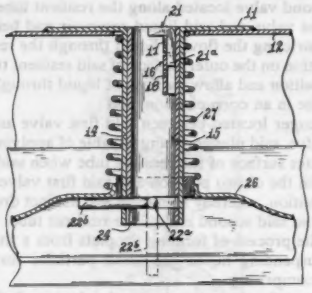
4,042,158

SPARE WHEEL CARRIER

Kenneth I. Cole, 10721 S. Plahm Court, Worth, Ill. 60482

Filed June 10, 1976, Ser. No. 694,778
Int. Cl.² B62D *43/04*
U.S. Cl. 224—42.23 **8 Claims**

1. A spare tire and wheel carrier for vehicles including a plate that is mounted securely in a suitable position proximate the underside of a vehicle body, a cylinder rigidly secured at its upper end to said plate, said cylinder extending downwardly from said plate and having a bayonet slot in its wall opening onto the bottom end thereof, an inner cylinder within said outer cylinder and rotatable relative to said outer cylinder between a first position and a second position, an arm pivotally connected to said inner cylinder adapted when the inner cylinder is in said first position relative to the outer cylinder to hang downwardly vertically and when the inner cylinder is in said second position relative to the outer cylinder to lie horizontally and project through the bayonet slot, and means on the inner



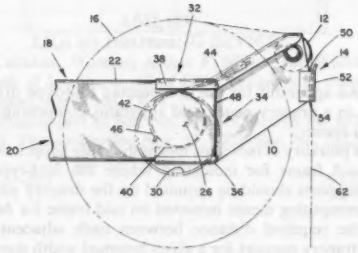
cylinder to facilitate rotation of said inner cylinder between said first and second positions, whereby a wheel, when telescoped onto the outer cylinder, is retained thereon by the arm when it is in its horizontal position.

4,042,159

TOILET ROLL TISSUE DISPENSER

Jane M. Tucky, Corona, Calif., assignor to Ben E. Lofstedt, Buena Park, Calif.

Filed July 31, 1975, Ser. No. 600,611
Int. Cl.² B26F *3/02*
U.S. Cl. 225—15 **4 Claims**



4. An improved toilet tissue roll dispenser for use in conjunction with a toilet tissue roll holder wherein said toilet tissue roll is rotatably mounted, via the central passageway therethrough, on a bar secured to the arms of a U-shaped structure, comprising:

a. frame means wherein the ends of said pair of fingers each have a slot therein for receiving said bar therein, and further including a first channel formed in each of said ends of said pair of fingers arranged along the top edge of said finger above said slot for slideably mating over the upper portion of said arms of said holder to form a cap therefor, and a second channel corresponding to said first channel and oppositely disposed thereto, said second channel being arranged along the bottom edge of said finger below said slot for slideably mating over the lower portion of said arms of said holder to form a cap therefor;

b. coupling means for securing said fingers of said frame means to said arms of said holder;

c. roller means disposed forwardly of said holder in spaced-apart, longitudinal relationship to said bar and above said first cross-member, said roller means having a pair of oppositely-disposed ends journaled for rotation within said receptacles of said frame means, whereinover said toilet tissue is drawn and thereafterwards is disposed in

intimate relationship to said blade-like edge of said first cross-member of said frame means; and

d. a pair of arcuate retainer springs, each having one end which is fixedly anchored respectively to said frame means and the other portion arranged to bridge the entrance to said slot, whereby when said bar is mated to said slot, said bar is captured therein by said spring bridging said slot entrance.

4,042,160

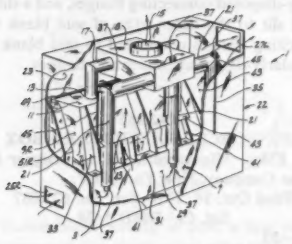
FIREPLACE FORM

John C. Ickes, 2017 Florida Ave., Joplin, Mo. 64801

Continuation-in-part of Ser. No. 516,170, Oct. 21, 1974, abandoned, which is a continuation-in-part of Ser. No. 465,853, May 1, 1974, abandoned. This application June 27, 1975, Ser. No. 590,793

Int. Cl.² F24B *7/00*

U.S. Cl. 126—121 **13 Claims**



1. A fireplace form comprising a firebox adapted to contain a fire of burning logs or other fuel having an open front, a back wall, and a pair of side walls at opposite sides of said back wall and extending toward said open front, said firebox having main flue outlet means generally at its top in communication with a chimney flue, said firebox having at least one aperture in its said back wall intermediate the bottom of the firebox and said main flue outlet means, said fireplace form further comprising duct means on the back side of said firebox in communication with said aperture and said chimney flue, said aperture and said duct means constituting auxiliary flue means for at least partially ducting away smoke and other products of combustion from said firebox, and means for circulating fresh air over the sides and back of said firebox and over said duct means so as to be heated and for exhausting said heated air into a room, said fresh air circulating means comprising an outer housing spaced from the outside of said firebox defining a chamber between said firebox and said outer housing, said chamber having inlet means for the intake of said fresh air and outlet means for the discharge of said heated air and further comprising a fresh air conduit disposed vertically within said duct means having an inlet at its lower end for the intake of fresh air and an outlet at its upper end for the discharge of heated air into said room via said outlet means.

4,042,161

AUTOMATIC WELDING APPARATUS

Shimon Ando, Hitachi, Japan, assignor to Hitachi, Ltd., Japan

Filed Mar. 30, 1976, Ser. No. 672,079

Claims priority, application Japan, Apr. 2, 1975, 50-39153

Int. Cl.² B23K *37/02*

U.S. Cl. 228—102 **8 Claims**

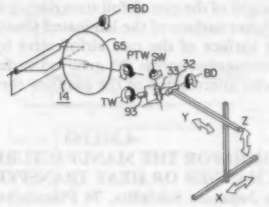
1. An automatic welding apparatus comprising a robot and a welding torch having a tip, wherein said robot comprises:

a main body serving as a drive means;

an arm supported by said main body and driven thereby to move in three-dimensional directions;

a wrist connected to a forward end of said arm and pivotable around at least two pivotal axes extending perpendicular to each other, said welding torch being supported by said wrist;

two tactile sensors mounted on said wrist for tactually sensing positions of components to be welded into a unitary structure and having respective axes extending perpendicular to one another, one of said tactile sensors extending perpendicular to one of said at least two pivotal axes of said wrist; and



means for calculating the positions of points at which welding is to be performed based on the amount of displacement of each said tactile sensor and producing control signals whereby the tip of said welding torch can be positioned in each said point in response to each of said control signals.

4,042,162

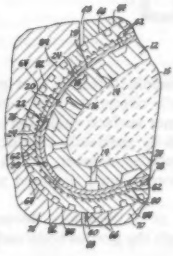
AIRFOIL FABRICATION

George B. Meginnis, and Earl W. Sodeberg, both of Indianapolis, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed July 11, 1975, Ser. No. 595,025

Int. Cl.² B23K *19/00*

U.S. Cl. 228—106 **3 Claims**



1. A method for bonding a laminated structure to a cast airfoil strut comprising: preforming a cast airfoil strut to have a leading edge, a trailing edge and first and second walls joining the leading edge to the trailing edge and the walls having cooling passages therethrough, preforming a laminated metallic sheath having an exterior surface and an inner surface each with a plurality of pin hole openings formed therein for communicating the wall cooling passages in the cast airfoil strut with the exterior surface of the sheath, wrapping said sheath by locating its inner surface over the first and second walls of said cast airfoil strut from the leading edge to the trailing edge and tack welding a portion thereon to the leading edge of said cast airfoil strut, preforming one side of a compressible pressure pad with a plurality of ribs and grooves each formed on the one side to extend completely across one length of the pad, preforming the opposite side of the compressible pressure pad to have a plurality of spaced apart separate lands, wrapping the pressure pad on the outer surface of the laminated metallic sheath to locate the plurality of ribs and grooves in contact across the full planar extent of the exterior surface of the laminated sheath including the full height thereof, thereafter placing the wrapped compressible pressure pad, laminated sheath

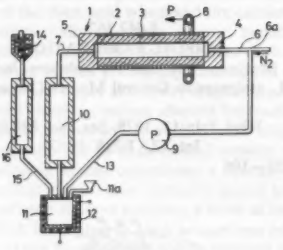
and cast airfoil strut between the contoured pressure blocks and applying a predetermined load to deform the separate lands and to press the plurality of ribs thereon against the exterior surface of the laminated sheath for distributing load to the laminated sheath without deformation thereof, applying a vacuum to the pressure loaded pieces and maintaining a bonding temperature thereon, directing outgas flow from between the cast airfoil strut and laminated sheath outwardly along the grooves formed in the one side of the compressible pad along the full height of the cast airfoil strut during the bonding operation, the inner surface of the laminated sheath being bonded to the outer surface of the cast airfoil strut by the pressure directed thereagainst across the grooved surface of the pressure pad without interruption of the gas flow through the grooves.

4,042,163

METHOD FOR THE MANUFACTURE OF A HEAT EXCHANGER OR HEAT TRANSFER ELEMENT

Hermann Johannes Schladitz, 74 Plaentschweg, Munich, Germany

Filed Aug. 20, 1975, Ser. No. 606,221
Claims priority, application Germany, Aug. 23, 1974, 2440563
The portion of the term of this patent subsequent to Oct. 22, 1991, has been disclaimed.
Int. Cl.[2] B21D *53/02*; B23P *15/26*
U.S. Cl. 228—198 **9 Claims**



1. A method of manufacturing a heat exchanger or heat transfer element which comprises a heat-conductive tubular member having an inner surface enclosing a heat-conductive, porous body attached by thermally-conductive means to the inner surface of the tubular member, which comprises;

a. providing said porous body disposed within said tubular member;

b. passing vapors of a thermally decomposable metallic compound through the porous body and the tubular member; and

c. thermally decomposing said compound in a first zone of said porous body adjacent to the inner surface of the tubular member, by heating said tubular member while maintaining said compound from substantial thermal decomposition in a second zone of said porous body remote to the inner surface of the tubular member; whereby the metallic product of said decomposition is deposited at said first zone and connects the porous body to the inner surface of the tubular member.

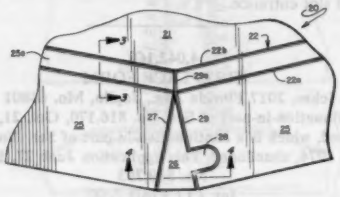
4,042,164

CONTAINER END STRUCTURE

Thomas E. Croley, Worthington, Ohio, assignor to Corco, Inc., Worthington, Ohio

Filed Dec. 10, 1976, Ser. No. 749,293
Int. Cl.[2] B65D *3/04, 13/04*
U.S. Cl. 229—23 BT **7 Claims**

1. An end structure for a tubular container of polygonal cross section comprising a substantially disc-like blank having an outer peripheral edge, said blank having a double score line inwardly of its edge and extending completely therearound and consisting of an inner score line and an outer score line in spaced parallel relationship and spaced inwardly of the edge of said blank to provide pairs of double score lines angularly disposed to form a polygonal outline complemental to the container body with which it is to be used, the lines of adjacent pairs coming together at a vertex and the lines being at a selected angle depending on the number of sides of the polygon,



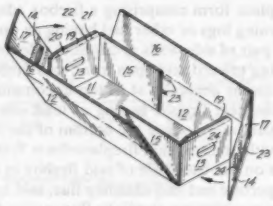
a slit extending from each vertex of the inner score line to the corresponding vertex of the outer score line to provide separate angularly-disposed connecting flanges, and a slit extending on from that slit to the outer edge of said blank to provide separate attaching flanges connected to said blank by the respective angularly-disposed connecting flanges.

4,042,165

REINFORCED PAPERBOARD BOX

Jerome Earl Elder, Minneapolis, Minn., assignor to International Paper Company, New York, N.Y.

Filed Oct. 14, 1975, Ser. No. 622,087
Int. Cl.[2] B65D *5/28*
U.S. Cl. 229—33 **3 Claims**



1. In a paperboard box for relatively large pieces of cut-up meat, that is adapted to be set-up, filled with meat and closed, using adhesive materials, on automatic equipment, that has reinforced side walls and end walls, and that is formed from: a generally rectangular, bottom panel (11); a pair of upstanding, generally rectangular, side wall panels (12), foldably connected to opposite edges of the bottom panel (11); a pair of upstanding, generally rectangular, end wall panels (13), foldably connected to opposite edges of the bottom panel (11); a pair of upstanding, generally rectangular, side wall reinforcing flaps (15), each foldably connected to an upstanding edge of one of the end wall panels (13) and located inwardly of and in face to face contact with one of the side wall panels (12); a pair of upstanding, generally rectangular, end wall reinforcing flaps (14), each foldably connected to an upstanding edge of one of the side wall panels (12) and located outwardly of and in face to face contact with one of the end wall panels (13); a pair of generally rectangular, side closure flaps (16), each foldably connected to the upper edge of one of the side wall panels (12) and disposed substantially perpendicular to the side wall panels (12); and a pair of generally rectangular, end closure flaps (17), each foldably connected to the upper edge of an end wall reinforcing flap (14) and disposed substantially perpendicular to the end wall panels (13); the improvement which comprises:

a pair of support tabs (19), each underlying one of the end closure flaps (17) and the pair of side closure flaps (16) and each having disposed substantially perpendicular to the end wall panels (13) along a cut and scored fold line (20)

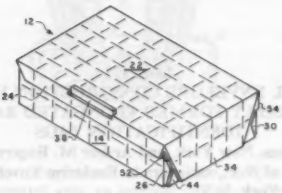
between the upper edge of each end wall panel (13) and each support tab (19).

4,042,166

PAPERBOARD CARTON

Howard Selin, Morton Grove, and John R. Marker, Jr., Waukegan, both of Ill., assignors to Stone Container Corporation, Chicago, Ill.

Filed Apr. 14, 1976, Ser. No. 677,011
Int. Cl.² B65D 5/30
U.S. Cl. 229—33 8 Claims



1. In a carton blank having at least a first panel having a hingedly connected flap along a first edge thereof, an intermediate panel having a first width formed along a second edge opposite said first edge, a second panel formed adjacent to said intermediate panel, and a terminating panel having a width substantially equal to said intermediate panel width formed adjacent to said second panel, said terminating panel having a free end opposite said second panel, the improvement comprising:

a first pair of planar side panels having a width not exceeding said intermediate panel width each hingedly connected along opposite free edges of said second panel;

each of said side panels having a pair of opposite marginal edges free of the second panel to which it is connected, each of said marginal edges having an inwardly offset medial part, the remaining parts of each said marginal edges adapted to be assembled abutting the intermediate and terminating panels.

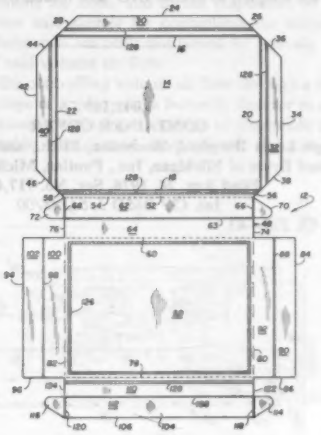
4,042,167

DIE CUT BLANK AND TRAY ASSEMBLED THEREFROM

Joseph R. D'Alessio, Wilbraham, Mass., assignor to Champion International Corporation, Stamford, Conn.

Filed Jan. 4, 1977, Ser. No. 756,626
Int. Cl.² B65D 5/22
U.S. Cl. 229—34 HW 11 Claims

1. A carton tray comprising a base member, and a plurality of side wall flanges upstanding thereon in adjacent continuous relationship; said base member comprising an integrally connected bottom and top panel, said top panel concentrically overlying said bottom panel; said base member including a continuous marginal flange extending outwardly beyond said side wall flanges upstanding thereon; said plurality of side wall flanges being formed form a corresponding plurality of discrete continuations of said top panel, one of said corresponding



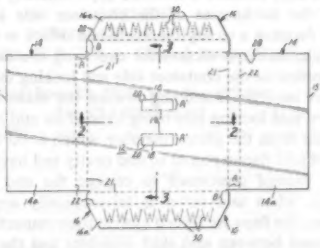
plurality of discrete continuations of said top panel being a commonly discrete continuation of said bottom panel.

4,042,168

PACKAGING CONTAINER BLANK

Richard G. Kasel, South St. Paul, Minn., and Paul C. Brown, Hudson, Wis., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Aug. 31, 1976, Ser. No. 719,288
Int. Cl.² B65D 5/06, 85/671
U.S. Cl. 229—40 9 Claims



1. A packaging container blank comprising a rectangular central section, two outer panels attached to opposite edges of said central section and two flange panels attached to the other opposite edges of said central section;

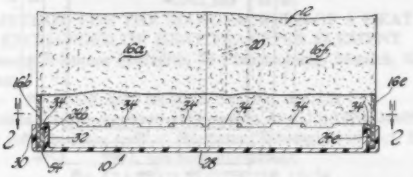
wherein said central section includes at least one tab hinged on one edge thereof to said central section and lying in the plane of said central section, the remaining edges of said tab being severed from said central section, said tab being adapted to be disposed normal to the plane of said central section at a distance equal to the interior height of the formed container;

wherein each of said outer panels and said flange panels are foldable along the edges of said central section and are further foldable along predetermined lines parallel to the edges of said central section; and

wherein each of said outer and flange panels are adapted to form right angles at the edges of said central section and at said predetermined lines when folded, and wherein the portions of said outer panels and of said flange panels between the edges of said central section and said prede-

termined lines form the sides of said packaging container upon folding; and wherein a portion of said flange panels are adapted to extend over said folded outer panels.

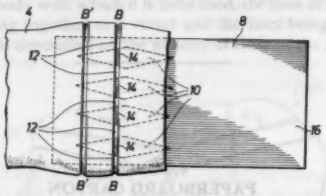
4,042,169
CONTAINER COVER
Joseph Louis Burgdorf, Rochester, Mich., assignor to Corrugated Drum of Michigan, Inc., Pontiac, Mich.
Filed Aug. 24, 1976, Ser. No. 717,451
Int. Cl.[2] B65D *5/64, 43/00*
U.S. Cl. 229—43 **10 Claims**



1. In combination with a multi-sided container of corrugated material having foldable flaps attached to the ends of at least some of the sides thereof along a fold line, each of said flaps being foldable against the side to which it is attached, an injection molded plastic container cover comprising: a multi-sided planar member having an equal number of sides as the container and an area approximately equal to the transverse cross-sectional area of the container, a first continuous skirt member around the periphery of said planar member extending generally laterally away from said planar member, a second continuous skirt member extending from said planar member in the same direction as said first skirt member and being generally parallel to said first skirt member and spaced inwardly from said first skirt member a distance approximately equal to the sum of the thicknesses of the container side and the flap thereby forming a cavity therebetween which is substantially rectangular in cross section for capturing the container flap and a portion of the container side and locking tabs on one of said skirt members extending toward the other of said skirt members, said locking tabs being located on said skirt member a distance from the planar member which is no less than the length of said flap captured in said cavity and having at least a portion thereof positioned to engage the end of the flap whereby, when said cover is telescopically applied to the container, the flaps are forced against their respective sides and compressed between said skirt members and the ends of the flaps are engaged by said locking tabs to permanently lock said cover in place.

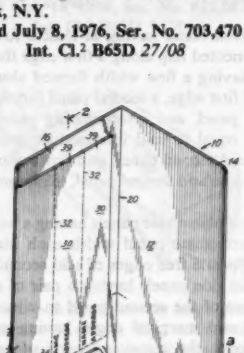
4,042,170
STERILE PACKAGE
Bjorn Ekman, and Lars Tyrefors, both of Upplands Vasby, Sweden, assignors to AB Svenska Dental Instrument, Upplands Vasby, Sweden
Filed May 5, 1976, Ser. No. 683,621
Claims priority, application Sweden, May 6, 1975, 7505268
Int. Cl.[2] B65D *31/14, 19/00*
U.S. Cl. 229—62.5 **12 Claims**

1. A closed sterile package of flexible weldable plastic material having at least one end construction comprising two mutually opposite portions of said plastic material, a valve element disposed between said portions, said valve element being formed of a gas pervious material and defining at least one hole through the thickness thereof, and a welding seam extending across said portions and effecting a seal between said portions



at least through said hole and a seal between said portions and said valve element elsewhere.

4,042,171
TRAVEL ENVELOPE CONSTRUCTION HAVING INTEGRALLY FORMED ELONGATED BAGGAGE IDENTIFICATION TAGS
Martin I. Ross, New York, and Arthur M. Rogers, Far Rockaway, both of N.Y., assignors to Exclusive Envelope Corporation, New York, N.Y.
Filed July 8, 1976, Ser. No. 703,470
Int. Cl.[2] B65D *27/08*
U.S. Cl. 229—72 **42 Claims**

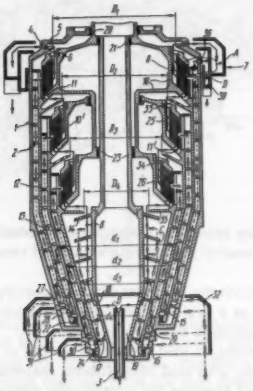


1. A wallet-type envelope construction comprising
an outer panel having a longitudinal dimension and a lateral dimension, and
an inner panel having a longitudinal dimension and a lateral dimension,
said outer panel being secured to said inner panel along a common edge,
means for securing the bottom edge portion of said inner panel to the bottom edge portion of said outer panel,
said outer and inner panels defining a pocket therebetween capable of having tickets and the like positioned therewithin,
a longitudinally extending portion of said inner panel having name and address indicia thereon to form at least one elongated identification tag,
at least a portion of said longitudinally extending identification tag having an adhesive layer disposed on the rear surface thereof, and
said elongated identification tab being a detachably secured portion of said inner panel.

4,042,172
BOWL CENTRIFUGE ROTOR

Andrei Stepanovich Nozdrovsky, Krasnaya ulitsa, 50, kv. 29, Leningrad, U.S.S.R.

Filed Apr. 14, 1976, Ser. No. 676,990
Int. Cl.[2] B04B 3/04
U.S. Cl. 233—7 6 Claims



1. A bowl centrifuge rotor comprising a hollow rotary casing having a central axis, an internal cavity, and provided at one end with windows for discharge of clarified liquid and at an opposite end with sediment discharge windows: a hollow external screw conveyer installed in the cavity of said casing and being coaxial therewith, said conveyer having a discharge end oriented in the direction of the sediment discharge windows in said casing and provided with sediment discharge windows of its own, said external screw conveyer having a cavity for receiving at an end of said conveyer a suspension to be processed; a pack of separating plates positioned adjacent said external screw conveyer coaxial therewith in the path of flow of the suspension, during processing thereof, toward the windows made in said casing for discharge of clarified liquid; at least one internal screw conveyer installed in the cavity of said external screw conveyer coaxial therewith between its discharge end and said pack of separating plates and having a charging end oriented in the same direction as said external screw conveyer and rigidly secured to said casing for rotation therewith, as a result of which different sizes of solid phase fractions of the processed suspension are transported separately by said screw conveyers.

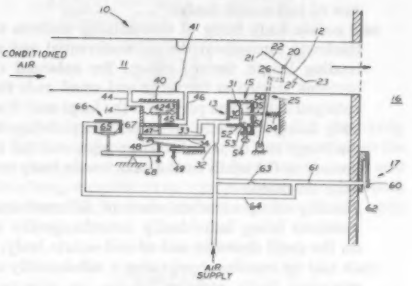
4,042,173
METHOD AND APPARATUS FOR CONTROLLING VOLUME AIR FLOW

George C. Boyer, and Raymond J. Fermanich, both of Rockford, Ill., assignors to Barber-Colman Company, Rockford, Ill.

Filed Sept. 4, 1975, Ser. No. 610,122
Int. Cl.[2] F24F 7/04
U.S. Cl. 236—49 23 Claims

1. A volume air flow controller employing as a damper biasing means a bias torque acting on said damper as a function of the unstable, unbalanced aerodynamic forces produced by the air flow past the damper, said controller comprising in combination a duct, a butterfly damper movable about a pivot between closed and opened positions to control air flow through said duct, means for applying to the damper a supplementary torque in a damper-closing direction substantially only sufficient to overcome the effective static friction of the damper in a damper-opening direction, an actuator applying an operating torque for moving said damper toward the fully opened position, said actuator being substantially only sufficiently powerful to balance the maximum resultant of said bias and supplementary torques, a flow sensor producing a flow signal as a function of the sensed value of said volume air flow, means for establishing a control signal as a function of a desired value of said volume air flow, and means responsive to the difference between said signals for controlling the actuator such that the damper is variably positioned to provide the desired value of said volume air flow.

18. A method for controlling volume air flow through a duct comprising the steps of applying to a butterfly damper in said duct a damper- closing bias torque variable in magnitude as a function of unstable, unbalanced, aerodynamic forces pro-

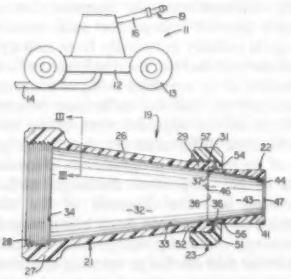


duced by the air flow past the damper, applying to the damper a supplementary torque in a damper-closing direction substantially only sufficient to overcome the effective static friction of said damper in a damper-opening direction, sensing the volume air flow through the duct, and applying to the damper a damper-opening operating torque varying in magnitude as a function of said sensed volume air flow such that the damper is positioned to maintain a predetermined volume air flow through the duct by a balance between the operating bias and supplementary torques.

4,042,174
NOZZLE ADAPTER

Alvie G. Vaughn, R.R. No. 1, Osgood Road, Mendon, Mich. 49072

Filed June 21, 1976, Ser. No. 697,854
Int. Cl.[2] B05B 3/02
U.S. Cl. 239—286 1 Claim



1. In an agricultural irrigation apparatus having a wheeled frame, a water discharge pipe swingably supported on said frame for substantially horizontal angular displacement, and nozzle means mounted on the discharge end of said discharge pipe, the improvement wherein said nozzle means comprises:

a tapered elongated one-piece sleevelike nozzle body having thread means associated with the large diameter end thereof for threadably attaching said nozzle body to said discharge pipe, said nozzle body having an elongated flow passage extending therethrough which is of a truncated

conical configuration, said flow passage having a large diameter inlet opening at the rearward end thereof which is of a diameter substantially equal to the diameter at the discharge end of said discharge pipe, said flow passage having a smaller diameter discharge opening at the other end thereof, said flow passage being of uniform slope as it extends between said inlet and discharge openings, said nozzle body also having a shallow annular recess extending inwardly from the small diameter end thereof in surrounding relationship to said discharge opening so that said recess forms a substantially annular seating surface which is within a plane substantially perpendicular to the axis of said nozzle body;

said nozzle body being of substantially uniform radial wall thickness throughout the circumferential and axially extending length thereof except for enlarged cylindrical portions formed at the large and small ends thereof, the enlarged cylindrical portion at the large end of said nozzle body being internally threaded for receiving therein the discharge end of said discharge pipe, and the cylindrical portion at the small end of said nozzle body being externally threaded;

a plurality of tip members each of different size, said tip members being individually interchangeably mountable on the small diameter end of said nozzle body;

each said tip member comprising a substantially cylindrical one-piece body member having an enlarged annular flange at one end thereof, said flange being of a size compatible with the recess formed in the small diameter end of said nozzle body, each said tip member also having a flow passage extending axially therethrough, said flow passage being of a truncated conical configuration and having an inlet orifice at one end of said cylindrical body which is of a diameter equal to the discharge opening formed in said nozzle body, each said tip member also having a discharge orifice formed at the other end thereof which is of a substantially smaller diameter than said inlet orifice, said discharge orifice being located directly in the axial end face of said cylindrical body as defined at said other end, and said flow passage being of uniform slope as it extends between said inlet and discharge orifices, the slope of the flow passage in said tip member being identical to the slope of the flow passage in said nozzle body;

said plurality of tip members being identical except for each tip member being of different axial length from all of the other tip members so that each tip member of said plurality has a different diameter discharge orifice, the cylindrical body forming each said tip member being of substantially uniform external diameter throughout the axial length thereof except for said annular flange which projects radially outwardly from said cylindrical body at said one end thereof, the discharge orifices defined by said plurality of tip members being of progressively increasing diameters so that the difference between the discharge orifices of the adjacent sizes of tip members is thus a preselected differential amount, the length of said plurality of tip members progressively decreasing as the diameters of the respective discharge orifices progressively increase, and the diameter of the discharge opening formed in said nozzle body being larger than the largest discharge orifice by said preselected differential amount, whereby said discharge opening can itself be utilized as a discharge orifice when a tip member is not mounted on said nozzle body; and

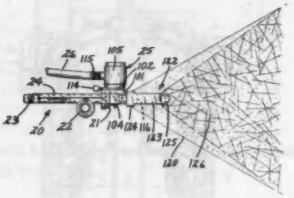
an annular one-piece nut encircling and being threadably connected to the externally threaded cylindrical portion at the small diameter end of said nozzle body, said nut having an annular flange which projects radially inwardly so as to overlap the axial end face of said nozzle body at the small end thereof, the flange on said nut also projecting radially inwardly so as to overlap the annular flange on each of said tip members for fixedly holding the flange on a selected tip member in snug bearing engagement with the seating surface on said nozzle body.

4,042,175

APPARATUS AND METHOD FOR DISPENSING AND REINFORCING CEMENTITIOUS MATERIALS

Iver L. Johnson, 7100 Down Road, Edina, Minn. 55435

Filed Oct. 29, 1975, Ser. No. 626,636
Int. Cl.[2] B05B 7/14
U.S. Cl. 239—420 **1 Claim**



1. Dispensing apparatus comprising, in combination:

means continuously supplying a paste of cementitious material;

a gun for receiving said material and aerodynamically projecting it as a first flat fan toward a receiving surface;

a housing having a delivery nozzle;

means supplying to said housing a roving of strands of glass compatible with said cementitious material;

means in said housing for continously dissevering said roving to give individual fibers of substantial length adjacent said nozzle;

means supplying air under pressure to said housing for emerging from said nozzle as a compact stream of air bearing said fibers in generally aligned orientation, the transverse dimension of said fan being several times as great as the transverse dimension of said stream in the same direction;

adjustable means securing said housing to said gun so that said fan and said stream have generally the same direction;

diffusing means for impingement by said compact stream to deflect said stream into a second fan which impinges on the first fan near said gun at a large acute angle, the transverse dimensions of said fans at the locus of their impingement being substantially the same, so that said fibers are uniformly distributed with respect to said cementitious material for immediate and complete coating of said fibers by said material;

and means mounting said diffusing means on said housing to extend into said stream at a distance from said housing greater than said length of said fibers, so that said impingement causes turbulence in said stream to result in random orientation of said fibers therein.

4,042,176

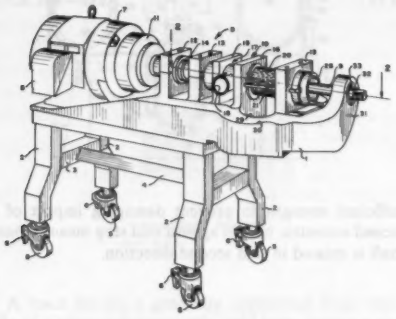
DEBONING APPARATUS AND METHOD

Nicholas Robert Beck, Atlanta; Gordon C. Leonard, Dalton, and Jack A. Prince, Gainesville, all of Ga., assignors to Meat Separator Corporation, Atlanta, Ga.

Filed Mar. 31, 1976, Ser. No. 672,317
Int. Cl.[2] B02C 23/16
U.S. Cl. 241—24 **32 Claims**

1. In the method of separating meat from bone in a deboning apparatus comprising infeeding bone laden material into the apparatus under the force and pressure of a grinder that reduces the same material to a particle size capable of being accommodated by the said apparatus, exposing the infeed material to the cooperative action of a pressure housing and a directly motor driven pressure auger to substantially increase the compressive forces exerted upon the said material therein to above 10,000 psi, revolving said pressure auger in excess of 500 revolutions per minute during functioning of the said apparatus, transferring the said pressurized material to the vicinity of the cooperative action between a perforated housing and a conveying auger to attain an expressing of meat

through the said perforated housing and a transfer of its boney component to and through a valved section of the apparatus while gradually attaining a pressure release from the said material from its prepressurized levels, transferring the said bone laden material along the said auger means without effecting its



temperature increase in excess of 3° Fahrenheit, and thereafter passing the said boney component through the valved section of the apparatus for its immediate exposure to blades that achieve its prompt disposal from the said deboning apparatus during its functioning.

4,042,177

RECOVERY OF METALLIC LEAD, LEAD COMPOUNDS AND PLASTIC MATERIAL FROM SCRAP STORAGE BATTERIES

John P. Cestaro, Lawrenceville; Ranna K. Hebbar, Hightstown, and Uriel S. Sokolov, Princeton, all of N.J., assignors to N L Industries, Inc., New York, N.Y.

Filed Oct. 4, 1976, Ser. No. 729,430
Int. Cl.² B02C *23/36*
U.S. Cl. 241—20 **4 Claims**

1. Method for recovering metallic lead, lead compounds and plastic material from the inert material present in scrap storage batteries which comprises the sequential steps of crushing the scrap storage batteries; adding the crushed material to an aqueous suspension of magnetic granular material thereby to separate the inert and plastic material from the metallic lead and lead compounds; magnetically separating the magnetic granular material from the inert and plastic material; and separating the plastic material from the inert material.

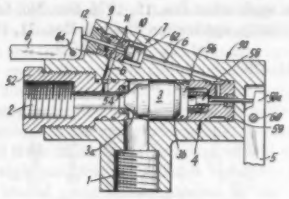
4,042,178

SHUTOFF VALVE CONSTRUCTION PARTICULARLY FOR HIGH PRESSURE

Elmar Michael Veltrup, Krefeld-Fischeln, and Wolfgang Maasberg, Krudenberg, Post Drevenack, both of Germany, assignors to Woma-Apparatebau Wolfgang Maasberg & Co. GmbH, Germany

Filed Jan. 22, 1976, Ser. No. 651,252
Claims priority, application Germany, Jan. 25, 1975, 2503121
Int. Cl.² F16K *31/143*
U.S. Cl. 251—44 **4 Claims**

1. A shutoff valve or high pressures, particularly for high pressure spray guns, comprising a housing having an inlet passage, a discharge passage communicating with said inlet passage for the flow of fluid through said inlet passage and out said discharge passage, a valve seat defined between said inlet passage and said discharge passage, a differential piston movable in said housing between a closed position on said valve seat and closing said valve to close off the flow of fluid and to an open position spaced from said valve seat to open said valve, means defining a first control chamber on the side of said differential position opposite to said valve seat, a by-pass extending from said control chamber to said discharge passage having a second control chamber therein, first control valve means in said first control chamber including a first control member separately movable to an opened position to open said first control valve means and to communicate said first control chamber with said by-pass passage, second control valve means in said second control chamber including a second



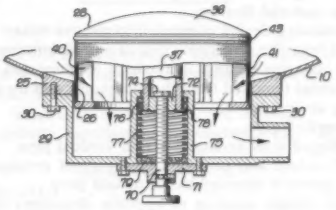
control member spaced apart from and movable separately from said first control member to an open position to open the said bypass passage and permit flow of fluid therethrough, said piston valve being movable to an open position only when both said first and second control members are moved to an open position.

4,042,179

MIXER WITH SCREEN VALVE

Claude K. Myers, and Gary A. Myers, both of 8376 Salt Lake Ave., Bell, Calif. 90201

Filed Mar. 8, 1976, Ser. No. 664,641
Int. Cl.² B02C *23/36*
U.S. Cl. 241—46.11 **1 Claim**



1. In a mixer for mixing a material and a grinding media, the combination of:

a container for receiving a grinding media and material to be mixed, said container having an outlet opening at the bottom thereof;

agitator means for positioning in said container for mixing the grinding media and material;

a poppet valve mounted in said outlet opening for sliding movement between a lowered position closing said outlet opening and a raised position permitting fluid flow through said outlet opening,

said valve being cylindrical in shape with a closed upper end and apertured side for flow of the mixed material therethrough when in said raised position while retaining the grinding media in said container; and

means for rotating said valve while in said raised position including

a threaded shaft journaled in a bushing below said valve,

a nut mounted on said shaft and affixed to said valve, and

a stop for limiting movement of said nut along said shaft,

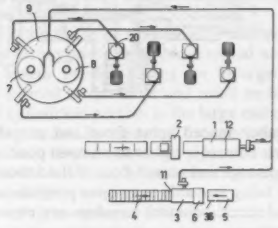
with rotation of said shaft in one direction translating said nut and valve from said lowered position to said raised position and when said nut engages said stop, rotating said valve for dislodging grinding media from said apertured side, and

with rotation of said shaft in the opposite direction translating said nut and valve from said raised position to said lowered position closing said outlet opening.

4,042,180
FEEDING AND RATIONING EQUIPMENT FOR MECHANICAL WOOD PULP, PRODUCTION WASTE AND EQUIVALENT

Gunnar Nordgren, Helsinki, Finland, assignor to Oy. Suomen Vanutehdas - Finnwad Ltd., Helsinki, Finland

Continuation of Ser. No. 516,928, Oct. 22, 1974, abandoned.
This application Jan. 15, 1976, Ser. No. 649,283
Claims priority, application Finland, Dec. 21, 1973, 3955/73
Int. Cl.[2] B02C *23/10*
U.S. Cl. 241—79 5 Claims



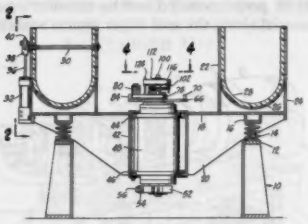
1. Feeding and rationing equipment for mechanical wood pulp, production waste and equivalent, comprising:
a. a sheet tearing unit;
b. a tearing unit for wood pulp;
c. a distributor unit connected to receive raw material from said two tearing units;
d. first cyclone means connected in the path of raw material passing from said two tearing units to said distributor unit;
e. a mixing mechanism disposed in the distributor unit to mix raw material therein;
f. a rationing device connected to remove mixed raw material from the distributor unit at a predetermined rate;
g. at least one feeding unit which is connected to receive material removed from the distributor unit by said rationing device and which comprises:
a vertical pipe,
a hinged door arranged at said vertical pipe,
a flywheel and camshaft arrangement arranged to give outwards directed blows to said door,
two wheels rotating in opposite directions and having spiral-shaped wings for receiving said raw materials, and a relatively small mixing roller arranged underneath said two wheels; and
h. second cyclone means connected in the path of raw material passing from said distributor unit to said feeding unit.

4,042,181
LEAD ANGLE CONTROLLING MECHANISM

Gene A. Huber, San Dimas, and Jon A. Knartzer, Buena Park, both of Calif., assignors to SWECO, Incorporated, Los Angeles, Calif.

Filed June 23, 1976, Ser. No. 698,934
Int. Cl.[2] B02C *17/08*
U.S. Cl. 241—175 9 Claims

1. A lead angle controlling mechanism for a vibratory apparatus having a reversible shaft drive mechanism, comprising
a first eccentric weight fixedly mounted to the shaft of the reversible shaft drive mechanism;
a second eccentric weight rotatably mounted to the shaft;
stop means fixed to rotate with the shaft for constraining the rotational motion of said second eccentric weight to an arc between two preselected angles relative to the position of said first eccentric weight on the shaft, said second eccentric weight thereby assuming a first position at one of said angles upon rotation of the shaft in a first direction and assuming a second position at the other of said angles upon rotation of the shaft in a second direction; and
biasing means fixed to rotate with the shaft and extending to said second eccentric weight biasing said second eccentric weight toward said first position, said bias means being of



sufficient strength to prevent damaging impact of said second eccentric weight against said stop means when the shaft is rotated in said second direction.

4,042,182
CRUSHING, MATERIAL-REDUCING, GRINDING AND LIKE MACHINES

Arthur Gerard Williamson, Shrewsbury, England, assignor to Mazel Holdings Limited, Douglas Isle of Man, England

Filed Dec. 2, 1975, Ser. No. 637,100
Claims priority, application United Kingdom, Dec. 3, 1974, 52287/74
Int. Cl.[2] B02C *15/10*; B32B *27/40*
U.S. Cl. 241—207 8 Claims

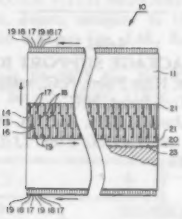
1. A machine part or component for use in crushing, material reducing, grinding and like machine, including a wearable metal portion and a layer of shock-absorbing backing material in close contact therewith in which said backing material comprises a filled polyurethane resin composition, the polyurethane resin being the reaction product of a cold-curing system comprising (a) a polyol component comprising (i) at least one polyether polyol having at least two hydroxyl groups per molecule, the average number of hydroxyl groups per molecule being more than 2, (ii) at least one polyol having at least two hydroxyl groups per molecule and containing both ether and ester groups, the average number of hydroxyl groups per molecule being more than 2, and (iii) at least one polyether diol; and (b) at least one aromatic polyisocyanate which is present in an amount such that there is an excess of isocyanate groups over hydroxy groups in the system, said at least one polyether polyol providing from 1.5 to 3.5 hydroxyl groups per hydroxyl group provided by said at least one polyol containing ether and ester groups, and said at least one polyether diol providing 10 to 30% of the total number of hydroxyl groups in the polyol component the major proportion of said composition being filler and sufficient resin being present to bind the filler into a unitary component.

4,042,183

ROTOR FOR MIXER-REFINER-REACTOR

Edward H. Cumpston, 43 Monument Ave., Old Bennington, Vt. 05201

Filed Apr. 21, 1976, Ser. No. 678,997
Int. Cl.[2] B02C 7/12
U.S. Cl. 241—292.1 17 Claims



1. A rotor having a generally cylindrical body extending axially of a mixer-refiner-reactor, said body having a plurality of axially extending slots opening radially inward from the cylindrical periphery of said body, said slots being narrower at said periphery of said body than in a region radially inward from said periphery of said body, said rotor comprising:

a. a plurality of flat plates extending generally transversely across said slots and arranged adjacent each other for substantially filling the axial length of each of said slots;

b. said plates being shaped to fit in said slots to be held against radially inward facing edges of said slots at the limit of radial outward movement of said plates relative to said slots;

c. at least some of said plates each having a projection extending radially outward beyond the periphery of said body; and

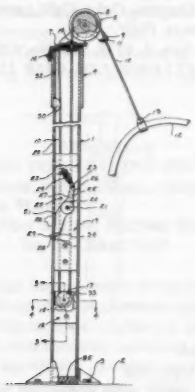
d. said projections providing working surfaces engaging material being worked through said mixer-refiner-reactor.

4,042,184

PUMP HOSE RETRIEVER

Willard J. Langenohl, 11142 W. Bradley Road, Milwaukee, Wis. 53224

Filed Sept. 2, 1976, Ser. No. 719,724
Int. Cl.[2] B65H 75/36
U.S. Cl. 242—47.5 7 Claims



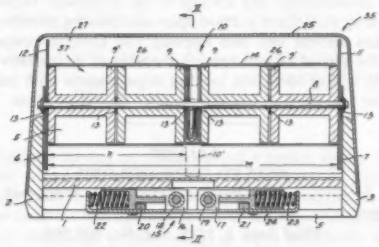
1. A pump hose retriever adapted to be connected to the discharge hose of a fuel pump, which comprises a hollow column disposed to be anchored in a fixed position, a pair of weights disposed inside the column with one being located above the other and the uppermost weight being of substantially greater weight than the lowermost weight and the lowermost weight being of a weight to keep the cable taut, means inside the column preventing rotation of the weights within the column, a cable secured to the upper portion of the column at one side thereof extending into the column and downwardly thereof when in nonservice position to substantially the bottom of the column and then reverse looped to extend upwardly and out the upper end of the column and disposed to be connected to the pump hose, meanssecured to the lower weight around which the cable is looped and the cable extending through elongated openings in the uppermost weight so that when the cable is pulled from the column the lower weight engages the uppermost weight and forces the latter upwardly in the column, spring loaded pawl means pivoted to the uppermost weight and the column having spaced apertures in the wall thereof over which the pawl means rides when moved upwardly with the uppermost weight within the column and in which the pawl means lodges upon a slight release of the cable by the operator, first cam means located inside the upper portion of the column, second cam means located inside the lower portion of the column in a position substantially opposite to the first cam means, and the first cam means engaging the pawl means to move it over center to a non-operative position so that the uppermost weight is free to move downwardly with the lowermost weight to retract the cable to a storage position inside the column, and the second cam means engaging the pawl means to move it over center to the initial position where it may again engage the apertures in the column and anchor the uppermost weight in a fixed position preventing retraction of the cable when the latter is in a service position.

4,042,185

DEVICE FOR RECEIVING A TAPE OF MATERIAL

Jean-Claude Risse, Prangins, Switzerland, assignor to J. Bobst & Fils S.A., Switzerland

Filed July 23, 1976, Ser. No. 707,942
Claims priority, application Switzerland, July 29, 1975, 009844/75
Int. Cl.[2] G03B 17/26
U.S. Cl. 242—71.7 9 Claims



1. In a device for receiving a tape of material such as an exposed photographic film or exposed photographic paper and including a closed case having a light-tight chamber and a tape infeed channel provided with shutters in communication with the chamber, the improvements comprising means for supporting a tape in the chamber during a winding of the tape, said means for supporting being disposed in the chamber for rotation about an axis, means disposed in the chamber for continuously pressing the tape against the means for supporting the tape, and means for laterally guiding the tape as it is being wound on the means for supporting, said means for laterally guiding including a disk disposed at each end of the means for supporting, a retractable guide member, and means for pivotably mounting the retractable guide member between the two

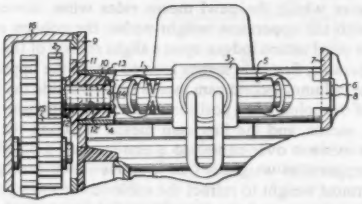
disks including a spring urging the guide member from a retracted position to an extended guiding position so that with the guide member in the extended guiding position, a narrow tape will be guided between the guide member and one disk and with the guide member in the retracted position, a wide tape is guided between the pair of disks.

4,042,186

FISHING REEL WITH BEARING FOR LEVEL WIND SHAFT

Borje Sigurd Moosberg, Morrum, Sweden, assignor to ABU Aktiebolag, Svangsta, Sweden

Filed Oct. 20, 1975, Ser. No. 623,990
Claims priority, application Sweden, Oct. 21, 1974, 7413211
Int. Cl.[2] A01K *89/04*; F16C *27/00, 43/00*
U.S. Cl. 242—84.42 **7 Claims**



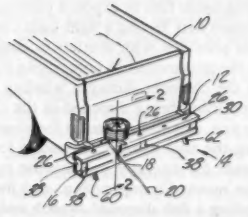
1. In a fishing reel having a frame including a wall member, a line-guide mechanism comprising a rotatable reversely threaded traversing screw, a line guide slidable on and operatively associated with said screw, and a bearing member for said screw mounted in said wall member, said wall member having an opening and said bearing member having a front end portion axially insertable in said opening, a rear end portion extending backwardly from said opening when the bearing member mounted on the screw is inserted in said opening, said wall member having two angularly spaced slots and said bearing member having two angularly spaced resilient projections extending axially from the rear end portion thereof in positions to be received each by one of said slots when the bearing member is inserted in said opening to a seated operative position therein for journalling the screw, said resilient projections being dimensioned and formed to be elastically radially deformed by axial force exerted upon said bearing member under insertion thereof into said opening and then, in conjunction with the arrival of said bearing member at its operative position, to spring back into locking engagements with said wall member to lock said bearing member in said position.

4,042,187

REELED WIRE HOLDER

Gene J. Snyder, 3820 Pontiac Lake Road, Waterford, Mich. 48095

Filed Sept. 2, 1975, Ser. No. 609,384
Int. Cl.[2] B65H *17/46*
U.S. Cl. 242—86.5 R **10 Claims**



1. A reeled wire holder, comprising:

a. a support stand,

b. means for detachably mounting the support stand to a bumper of a vehicle,

c. means for mounting a coil of wire onto the support stand, and

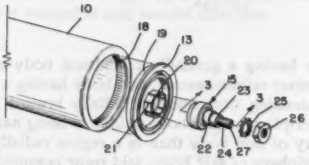
d. means for receiving a leg formed on the support stand such that upon receiving a leg the support stand can be detached from the bumper and stood upon the ground.

4,042,188

YARN PACKAGE SUPPORT BEARING

Michael S. Richards, High Point, N.C., assignor to Shawn Products Company, High Point, N.C.

Filed June 3, 1976, Ser. No. 692,342
Int. Cl.[2] B65H *49/00*; F16C *13/00, 33/00*
U.S. Cl. 242—129.51 **4 Claims**



1. A yarn package support bearing member for rotatably and releaseably retaining a yarn carrier cradled between supporting pivotable arms comprising; a stub shaft fastened to one of said pivotable arms intermediate the arm link, said shaft having an eccentric portion thereon for communicating with said arm, an enlarged head integrally formed on said shaft at one end thereof, said head having at least a partial spherical bearing contour, a cup bearing retaining housing in spaced relation to said enlarged head, a plurality of bearing members retained between said housing and said head, a closure member securely retaining said housing, bearing members and head in bearing relationship, said closure member having a stub shaft opening greater than the shaft diameter for a relatively loose shaft fit for angular displacement, means for retaining the shaft on said arm, and a yarn package supporting flange for releaseable mounting on said housing.

4,042,189

TAPE LEADER CHARACTERIZED BY DIFFERENTIAL BENDING STIFFNESS

Richard A. Lewis, Sherman Oaks, Calif., assignor to Interdyne Company, Van Nuys, Calif.

Filed Nov. 3, 1975, Ser. No. 628,117
Int. Cl.[2] G03B *1/04*; G11B *15/32*
U.S. Cl. 242—195 **16 Claims**

5. In combination:

a. an elongated tape, and

b. an elongated leader strip connected with the tape at an end thereof, the strip comprising at least two sub-strips which are interconnected in stacked relation, edge portions defined by one sub-strip projecting laterally beyond the edges defined by another sub-strip,

c. said leader strip having characteristic lengthwise unit bending stiffness which is substantially greater than leader characteristic widthwise unit bending stiffness at said edge portions of the one sub-strip,

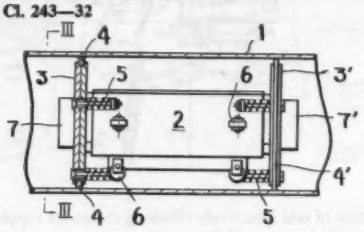
d. the two sub-strips having different bending moduli.

4,042,190

CONVEYANCE TRUCK WITH MOVABLE SEAL PLATES

Eijiro Ueno, Tokyo, Japan, assignor to Ueno Kohgyo Ltd., Tokyo and Taishin Kohgyo Co., Ltd., Kawaguchi, both of, Japan

Filed Nov. 19, 1975, Ser. No. 633,545
Int. Cl.[2] B65G *51/04*
U.S. Cl. 243—32 **2 Claims**



1. A conveyance truck for being movably positioned within a transport tube, said truck comprising:

a truck body;

a plurality of roller means affixed to the undersurface and sides of said truck body for supporting said truck body against the walls of said transport tube and for allowing said truck body to run along the inside of said tube; and

seal plate means attached to each end of said truck body and forced against the inside of said tube for securing said truck body air-tightly within said tube;

spring means connecting said seal plate means to said truck body for displacing said seal plate means relative to the position of said truck body with respect to curvatures of said tube and maintaining said seal plate means in contact with the inside of said tube, whereby said seal plate means continuously contacts said tube wall and an air-tight seal is maintained regardless of curvatures in said transport tube; and

said seal means is comprised of:

a seal plate member attached to said spring means and spaced from the end of said truck body, the outer edge of said seal plate member being spaced from the inside edge of said tube and having a groove therein around the circumference thereof; and

sealing material fitted in said groove in said plate member and extending outward therefrom against the inside of said tube.

4,042,191

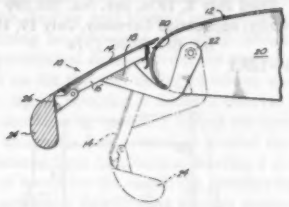
SLOT SEAL FOR LEADING EDGE FLAP

Kirby William Johnson, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed May 3, 1976, Ser. No. 682,567
Int. Cl.[2] B64C *9/26*
U.S. Cl. 244—214 **5 Claims**

1. In a leading edge flap assembly for an airplane wing, said wing having a leading edge portion, an upper surface and a span, said flap having an upper surface, a span, an underside, and a trailing edge, said assembly including means for mounting said flap for movement between a retracted position wherein said flap is stowed in said wing, and an extended position wherein said flap is positioned forwardly of said wing so that its trailing edge is positioned adjacent the leading edge of said wing and so that the upper surface of said flap is oriented to increase the camber and chord of said wing and so as to form a slot between the leading edge of said wing and said flap, an improved assembly for sealing said slot comprising:

a member having a lateral dimension and a longitudinal dimension, said member having in the lateral dimension an upper portion, a lower portion and at least a flexible central portion, the longitudinal dimension of said member being oriented in a spanwise direction along said flap, the upper portion of said member being affixed to the underside of said flap, the lower portion of said member being



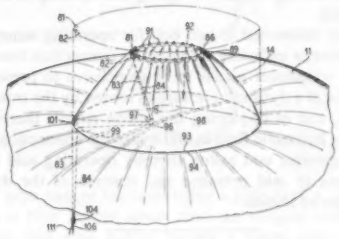
positioned adjacent and normally spaced from the leading edge portion of said wing when said flap is extended, the central portion of said member being sufficiently flexible so that when air flows from the underside of said flap upwardly past said member and through said slot, said central portion of said member will flex to allow said lower portion of said member to move toward and contact the leading edge portion of said wing in sealing engagement.

4,042,192

BALLOON WITH DEFLATION AND MANEUVERING PORTS

Forrest L. Walter, S. 4323 Locust Road, Spokane, Wash. 99206

Filed July 19, 1976, Ser. No. 707,770
Int. Cl.[2] B64B *1/62*
U.S. Cl. 244—99 **3 Claims**



1. A balloon having an envelope and a basket with a deflation port formed in said envelope comprising an opening formed in said envelope, a deflation panel attached to said envelope to cover said opening, a line attached to said deflation panel and extending to said basket so as to selectively allow said deflation panel to move relative to said opening to cover it by varying amounts, wherein said opening in said envelope is circular and is formed in an upper portion thereof, wherein said deflation panel is cylindrical in shape and has its lower edge connected to said envelope about said opening and said line is engageable with the upper edge of said cylindrical deflation panel and is arranged to open and close it, wherein said upper edge of said cylindrical deflation panel is formed with a plurality of spaced opening through which said line extends so as to open it and close it like a draw string, comprising a plurality of pulleys attached to said balloon so as to guide said line, wherein said plurality of spaced openings are formed by rings attached about said upper edge of said cylindrical deflation panel, and wherein a holding member is connected to said line and second and third lines extending downwardly from said holding member such that said second line is attached to said

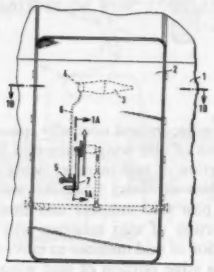
balloon where it is available for manual operation, and an automatic disconnect connected to said third line and operable from said basket.

4,042,193

SAFETY DEVICE FOR AIRCRAFT DOORS OR HATCHES

Gerd Cerne, Bremen, Germany, assignor to Vereinigte Flugtechnische Werke-Fokker GmbH, Bremen, Germany

Filed July 8, 1976, Ser. No. 703,599
Claims priority, application Germany, July 19, 1975, 2532350
Int. Cl.[2] B64C *1/14*
U.S. Cl. 244—129.1 **6 Claims**



1. In a device for securing door or hatch locks in aircrafts having manually operable means for unlocking and opening the door or hatch, the combination comprising:

transducer means including a piston means disposed to be displaced in response to dynamic pressure developed upon movement of the craft;

a bolt disposed for selectively securing and releasing the manually operable means, thereby respectively impeding and permitting manual unlocking and opening of the door or hatch;

a piston connected to said bolt for operating same; and

control means including a hydraulic connection connected to the transducer means to be responsive to presence or absence of a dynamic pressure as sensed by the transducer means, and as displacing the piston means, thereby displacing hydraulic fluid in said hydraulic connection which then operates said piston thereby operating said bolt in response to said presence and absence of the dynamic pressure as sensed.

4,042,194

PARACHUTE HARNESS RELEASE MECHANISM

Richard H. Frost, Littleton, and Ronald L. Criley, Lake City, both of Colo., assignors to Frost Engineering Development Corporation, Englewood, Colo.

Filed June 1, 1976, Ser. No. 691,351
Int. Cl.[2] B64D *17/32*
U.S. Cl. 244—151 A **22 Claims**

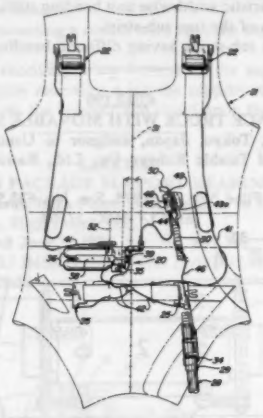
1. A parachute harness release mechanism for use on a parachute harness embodying releasable couplings for connection with parachute riser straps, releasable couplings for connection with survival kit lap belts, and an oxygen mask hose terminating in a releasable coupling for connection with an oxygen supply conduit, said mechanism comprising, in combination:

a. a single restraint free multi-positional control means mounted on said harness for selectively releasing said releasable couplings and having

1. a first operational position selectable for releasing only the riser strap couplings,

2. a second operational position selectable for releasing all of the harness mounted couplings simultaneously,

b. and means operative in response to said second position



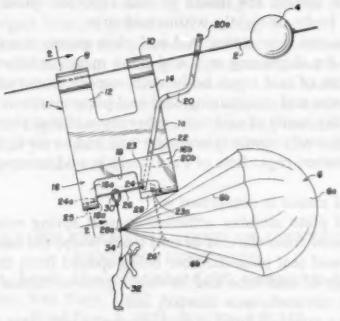
operation of said selectively releasing means for supplying air to said oxygen mask hose.

4,042,195

MECHANISM FOR RELEASING A TOY PARACHUTE FROM A KITE STRING

Hubert M. Howard, 741 Havenhill Lane, Dallas, Tex. 75217

Filed Aug. 2, 1976, Ser. No. 710,589
Int. Cl.[2] A63H *27/08*
U.S. Cl. 244—155 R **5 Claims**

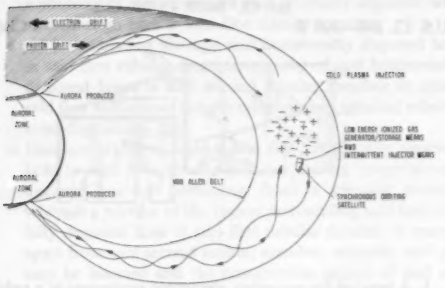


1. A toy parachute release device attachable to a kite string comprising: a body having at least one loop formed on the upper end, the end of said loop being spaced from the body to allow passage of the kite string into the loop, said body further having a recess formed in the lower end thereof; a lever arm; means pivotally securing said lever arm to said body; a retaining member having one end pivotally secured to the lever arm; a U-shaped channel formed on the lower end of said body; said channel having a groove formed in the lower portion thereof to receive and guide the free end of the retaining member whereby it can slide free of the body; a parachute; means to slideably secure said parachute to the retaining member; actuating means secured to the kite string such that as the air currents carry the parachute and body upwardly along the kite string to a predetermined height the lever arm engages the actuating means to pivot the lever arm, causing the end of the lever arm attached to the retaining member to move the retaining member from engagement with the body such that the free end of the retaining member pivots downwardly to release the parachute therefrom.

4,042,196
METHOD AND APPARATUS FOR TRIGGERING A SUBSTANTIAL CHANGE IN EARTH CHARACTERISTICS AND MEASURING EARTH CHANGES

Neil M. Brice, McLean, Va., assignor to Cornell Research Foundation, Inc., Ithaca, N.Y.

Filed July 21, 1971, Ser. No. 164,793
Int. Cl.[2] B64G 1/10
U.S. Cl. 244—158 4 Claims



1. Apparatus for triggering substantial change in a selected ionospheric characteristic of the earth comprising in combination

an earth orbital satellite,

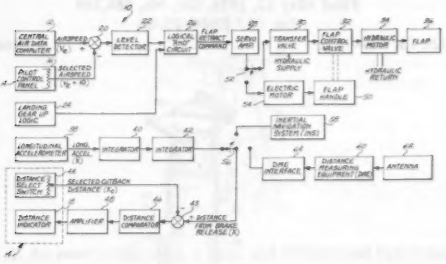
a source of low energy ionized gas on said satellite, and

means for causing the release of said gas from said satellite at selected time intervals determined by the location of said satellite, when in earth orbit, in a high intensity radiation field trapped by the earth's magnetic field.

4,042,197
AUTOMATIC CONTROLS FOR AIRPLANE TAKE-OFF AND LANDING MODES

James Alfred Boyle, Bellevue; Peteris Adams Galins, Renton; Mark Charles Gregoire, Issaquah, and Peter L. M. O'Toole, Bellevue, all of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Sept. 29, 1975, Ser. No. 617,621
Int. Cl.[2] G05D 1/12
U.S. Cl. 244—183 13 Claims



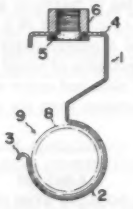
1. A device for controlling a flight pattern of an aircraft during take-off comprising: means for automatically retracting flaps in response to a sensed predetermined airspeed after stowing landing gear, said means comprising: means for comparing a voltage proportional to a preselected airspeed with a voltage proportional to airspeed from a central air data computer to impart a command voltage, and means for retracting the flaps upon the command voltage being received by the servo-amplifier, wherein the means for retracting the flaps in response to command voltage being received by the servo-amplifier comprises: a transfer valve controlled by the servo-amplifier, and a hydraulic motor driven by hydraulic fluid from the transfer valve; and means for determining and for indicating airplane position over a predetermined ground location at which point engine thrust is cut back to reduce the noise of climb-out.

13. A method of controlling a flight pattern of an aircraft during take-off and approach modes, the steps comprising: extending the flaps for take-off; entering a predetermined speed in a control panel; engaging an automatic flap mode to compare actual speed with the predetermined speed to retract the flaps with landing gear stowed and predetermined speed reached; arming an automatic signalling device to indicate reaching a preselected distance from the start of the take-off; cutting back on the throttle, during climbout, upon receiving the distance signal; selecting a distance interval from touchdown for a decelerating approach during the approach mode; arming the automatic flap control to extend the flaps in response to distance from touchdown; entering a predetermined lower limit of speed for the end of the decelerating approach; arming the automatic decelerating throttle controls to reduce thrust in response to sensed flap position; entering a bias to stabilizer position at point of initial deceleration, and arming an automatic trim control system to respond to sensed flap position in combination with bias modified initial stabilizer position.

4,042,198
PIPE HANGER

Kazuaki Takeuchi, Hita, Japan, assignor to Chuo Hatsujo Kogyo Co., Ltd., Hita, Japan

Filed Mar. 29, 1976, Ser. No. 671,249
Claims priority, application Japan, Mar. 31, 1975, 50-044315
Int. Cl.[2] E21F 17/02
U.S. Cl. 248—62 4 Claims



1. A pipe hanger for suspending a pipe from a ceiling comprising a pipe holder made from an integral strip of sheet material, said pipe holder having a lower pipe supporting portion for receiving and supporting a pipe, said pipe supporting portion being circular over an arc of more than 180° and less than 360° thereby leaving an opening for the insertion of a pipe through said opening into said pipe supporting portion, said pipe holder having an upper mounting portion extending from said lower pipe supporting portion, said mounting portion having a generally horizontal section in which an aperture is formed, a generally vertical section extending downwardly from said horizontal section, and an oblique section extending at an obtuse angle from said vertical section in a direction generally underlying said horizontal section such that the center of said circular pipe supporting portion generally underlies the center of said aperture, and a fitting element having an internal thread adapted to threadedly receive a threaded bolt extending from the ceiling, said fitting element having a generally cylindrical portion, said cylindrical portion having a section of reduced diameter, said aperture in said horizontal section of said mounting portion of said pipe holder being defined by a peripheral edge, said peripheral edge being accommodated and rotatably disposed in said reduced diameter section of said fitting element to thereby rotatably suspend said pipe holder from said fitting element in a position such that the

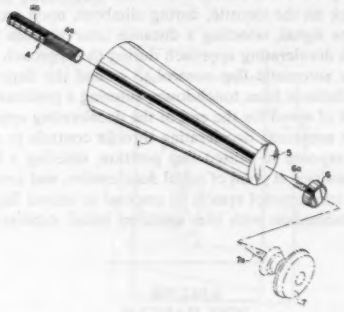
center of said circular pipe supporting portion underlies the axis of said cylindrical portion of said fitting element.

4,042,199

MOLDED FURNITURE LEG

Clifford Wilbur Winkler, Rte. 2, Box 561, Houghton Lake, Mich. 48629

Filed Dec. 19, 1975, Ser. No. 642,251
Int. Cl.[2] B60B 33/02; F16B 12/00
U.S. Cl. 248—188.8 2 Claims



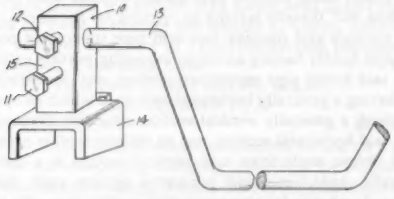
1. A molded hollow furniture leg comprising an outer wall having an inverted tapered configuration, a bottom wall, a centrally located hollow core extending from the top of said outer wall to said bottom wall, the internal opening through said hollow core progressively decreasing in size from the top down to provide for insertion of a stud in the upper end by which to attach the leg to furniture, a driving fit in the lower end for insertion of a nail shank of a furniture glide adjacent said bottom wall and a progressively increasing thickness of the core wall, and a plurality of equally spaced reinforcing ribs interconnecting said core and outer wall and which progressively increase in thickness from the top of said outer wall to said bottom wall.

4,042,200

UNIVERSAL MOUNT FOR SPLICING TOOL

Bob Eugene Overall, Santa Barbara, Calif., assignor to Margaret Mae Cooke, Santa Barbara, Calif.

Filed May 6, 1976, Ser. No. 683,710
Int. Cl.[2] A47B 96/06
U.S. Cl. 248—223.1 11 Claims



1. A support for mounting a splicing tool and holder in a substantially horizontally aligned plane on a vertical structure comprising:

A. a substantially horizontal splicing bar to which the holder and splicing tool are capable of being fixedly attached; and

B. a mount for securing said splicing bar to said vertical structure comprising:

1. attachment means for securing said mount to said vertical structure comprising a protruding key capable of securing the mount to a standard keyhole slot support;

2. clamping means for fixedly securing said horizontal splicing bar; and

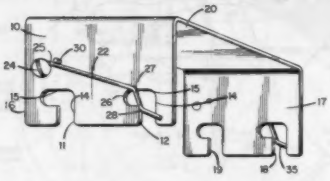
3. stabilizing means for maintaining the mount in a substantially vertical plane.

4,042,201

RADIO MOUNTING BRACKET

James S. O'Callaghan, Gilford, N.H., assignor to Tram/-Diamond Corporation, Winnisquam, N.H.

Filed July 27, 1976, Ser. No. 709,228
Int. Cl.[2] B60R 11/02
U.S. Cl. 248—309 R 8 Claims



1. A bracket for mounting electronic equipment in a vehicle comprising:

a. a U-shaped bracket having a first slot and a second slot in each upright of the U for receiving mounting studs attached to opposite sides of an equipment unit, each slot having an entrance at one end of an entrance leg and a foot formed substantially perpendicular to the other end of said leg so as to form an L shape;

b. at least one wire spring element having an eyelet at a first end and a double bend at a second end secured to each upright of said bracket with said second end blocking said first slot; and,

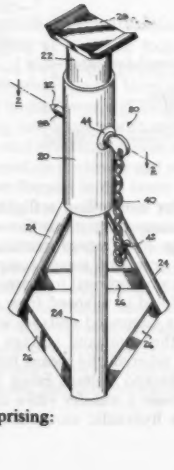
c. a pin mounted adjacent said first end to restrict rotation of said spring element, all whereby said spring element resists passage of equipment mounting studs into said first slot and then snaps behind it as it moves into the "foot" of the first slot to secure said equipment unit in place.

4,042,202

JACK STAND WITH SAFETY LOCKING DEVICE

Delmo C. Molinari, 10820 Ambazac Way, Los Angeles, Calif. 90024

Filed May 13, 1976, Ser. No. 686,169
Int. Cl.[2] E04G 25/00
U.S. Cl. 248—352 5 Claims



4. A jack stand comprising:

a generally upright tubular member, said first tubular member having means for defining a base for resting on a horizontal surface, and having a horizontally disposed through hole adjacent the upper end thereof;

a second generally upright tubular member coaxial with and slideable within said first tubular member, said second tubular member having adjacent the upper end thereof means for engaging and supporting a part of an automobile, said second tubular member further having a plurality of horizontally disposed through holes, each at one of a plurality of elevations and each generally alignable with said through hole in said first tubular member;

a pin for extending through said horizontally disposed hole in said first tubular member and any of said horizontally disposed holes in said second tubular member to retain said first and second tubular members in a selected relative axial disposition; and

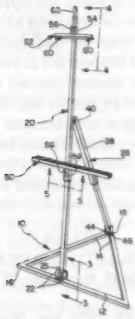
at least one region of said pin and said horizontally disposed hole in said first tubular member having cooperatively disposed sections deviating from a circular section, wherein a portion of the region surrounding said horizontally disposed hole in said first tubular member is spaced apart from said second tubular member, whereby said pin may be inserted and the non-circular region of said pin may be rotated therebetween so as to resist direct axial withdrawal thereof.

4,042,203

EASEL

Verona D. Warkentin, 1776 Alta Vista, Sarasota, Fla. 33577

Filed Oct. 7, 1975, Ser. No. 620,331
Int. Cl.² A47B 97/04
U.S. Cl. 248—449 **21 Claims**



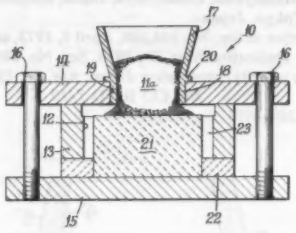
1. An easel comprising, a base, and column and brace members, means pivotally securing said members to each other and each to spaced apart portions of said base for swinging movement about substantially parallel axes between an erect operative position and a folded position, the securing means including a bifurcated part secured to said base and embracing an end of a first of said members with the first member pivoted to said part for said swinging movement, and when in said folded position the base, column and brace are generally parallel to each other and the bifurcation of the part embraces the other of said members to hold said members against movement transversely of each other, and means for mounting a workpiece on the column.

4,042,204

APPARATUS FOR BONDING A BRONZE BUSHING ON A METALLIC MEMBER

Richard G. Loebs, Peoria, and Richard C. Ostrowski, Dunlap, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 494,970, Aug. 5, 1974, Pat. No. 3,937,268.
This application Sept. 2, 1975, Ser. No. 609,644
Int. Cl.² B22C 9/06, 9/24
U.S. Cl. 249—57 **5 Claims**



1. An apparatus for bonding a bearing on an annular member comprising

a cover plate having a single bore formed centrally therethrough,

a support plate spaced axially downwardly from said cover plate,

fastening means extending through said cover plate and releasably attached to said support plate for releasably attaching said cover and support plates together,

single funnel means attached to said cover plate to extend through the bore formed centrally therethrough and communicating internally of said apparatus for communicating a meltable material therein, and

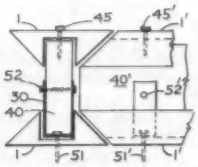
a non-metallic core mounted on said support plate to extend upwardly therefrom in close proximity to and below a lower end of said funnel means to define a space therebetween which extends laterally beyond a lower end of said funnel means.

4,042,205

MOLD ELEMENT FOR HORIZONTALLY FORMING PANELS

Flavel Deloyd Herrell, 2310 S. Cathy, Tucson, Ariz. 85710

Filed Dec. 8, 1975, Ser. No. 638,624
Int. Cl.² B28B 7/22
U.S. Cl. 249—189 **15 Claims**



1. Apparatus for horizontally forming concrete wall panels for tilt-up wall buildings comprising a first elongated base plate means having at least one elongated triangular shaped cross-sectioned chamfer means attached thereto; a side wall form having a first end juxtaposed said first base plate means and one side of said elongated triangular chamfer means; a second elongated base plate means secured to the other end of said side wall form, said second elongated base plate means having at least one elongated triangular shaped cross-sectioned chamfer means attached thereto with one side of said triangular shaped chamfer means which is attached to said second base plate means juxtaposed said other end of said side wall form; and

strap means fixedly attached to the first end of said side wall form; and pin-type fastening means including nail means securing said strap means to said first base plate means and said first base plate means to an associated floor, whereby said apparatus is arranged to form part of the wall panel perimeter.

4,042,206

MONOBLOCK HOT TOPS WITH ALIGNED FIBROUS MATERIAL

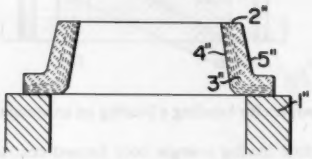
Shigeru Matsuyama, Utsunomiya, Japan, assignor to Aikoh Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 348,338, April 5, 1973, abandoned. This application Mar. 21, 1975, Ser. No. 560,903

Claims priority, application Japan, Apr. 10, 1972, 47-35237

Int. Cl.[2] B22D *7/10*

U.S. Cl. 249—197 **4 Claims**



1. A heat-insulating and retaining molding for hot tops of a hollow cylindrical monoblock type with the continuous wall of said hollow cylinder having a generally L-shaped cross section and being formed of a composition comprising, by weight, 25 to 35 percent inorganic fibrous material, 1 to 5 percent organic fibrous material, 50 to 70 percent refractory material and 5 to 10 percent binder, with the fibrous material at the inner surface of said hollow cylinder being aligned essentially parallel to said surface.

4,042,207

VALVE OPERATING MEANS FOR A MOLTEN METAL CONTAINER

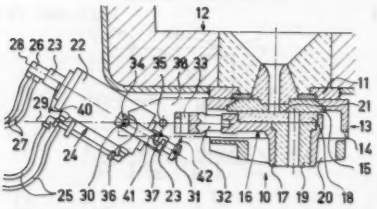
Friedrich Nehrlich, Volketswil, and Franz Ruckstuhl, Schwerzenbach, both of Switzerland, assignors to Metacon AG, Zurich, Switzerland

Filed Jan. 26, 1976, Ser. No. 652,057

Claims priority, application Switzerland, Jan. 28, 1975, 1011/75

Int. Cl.[2] F16K *31/122*

U.S. Cl. 251—62 **6 Claims**



1. The combination comprising gate-type slide valve means for a molten metal container having an outlet opening and means for operating said valve means,

said valve means including a valve member slidably mounted to move between an open and closed position transversely with respect to the opening of the container, said valve member having coupling means fixed thereon to be movable therewith, said valve means further including support means for pivotably supporting said valve operating means and stop means defining a pivoting end position for said valve operating means,

said valve operating means including an actuating member movable in a forward and a rearward direction and having means for coupling with said coupling means of said valve member to permit transmission of movement to said valve member in both of said directions when said respective coupling means are engaged and said valve operating means are in said pivoting end position,

said valve operating means further having a center of gravity disposed to pivot said valve operating means toward said pivoting end position and maintain engagement thereof with said support means and said stop means independent of the position of said actuating member of said valve operating member.

4,042,208

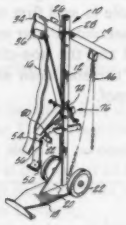
AUTOMOBILE BUMPER AND DOOR LIFTING AND POSITIONING ASSEMBLY

Tom S. Arakaki, 1563 S. Harvard, Los Angeles, Calif. 90006

Filed Jan. 26, 1976, Ser. No. 652,295

Int. Cl.[2] B66F *5/00*

U.S. Cl. 254—8 B **5 Claims**



1. An automobile component lifting and positioning assembly comprising a base member, a vertical support carried by said base member, lifting means pivotally secured to said vertical support, adjustable means carried by said lifting means for holding and positioning an automobile bumper, said holding and positioning means comprising an elongated strap, means for adjustably securing said strap to said lifting means, means carried by said strap for holding the upper edge of said bumper, a rigid gripping member secured to one end of said strap for holding the lower edge of said bumper, means slidably mounted on said vertical support for drawing said strap toward said support to vary the tension exerted on the upper edge of said bumper by said holding means and means for locking said lifting means in place upon said bumper being lifted thereby, whereby the angular orientation of said bumper with respect to said automobile can be varied about a horizontal axis to position the bumper for attachment to said automobile.

4,042,209

NAIL-EXTRACTING APPARATUS

Anthony S. Rowinski, 2635 Rambling Way, Bloomfield Hills, Mich. 48013

Filed June 18, 1976, Ser. No. 697,487

Int. Cl.[2] B66F *15/00*

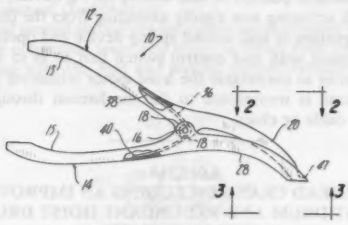
U.S. Cl. 254—21 **4 Claims**

1. In an apparatus for extracting an embedded nail from a surface, said apparatus being of the type comprising a pair of spaced apart lever arms having cooperating claw-like terminal ends, the improvement comprising:

a first lever having at its forward end a pair of claw-like fingers, the inner opposing surfaces of which terminate in a nail shank receiving slot, the fingers having inclined surfaces extending from the projecting ends of said fingers rearwardly toward said slot;

a second lever complemental to said first lever and having at its forward end a pair of spaced parallel support members, the lower edges of which are adapted to abuttingly engage

said nail-carrying surface when said nail is positioned in said shank receiving slot and said claw-like fingers are disposed between said support members; and



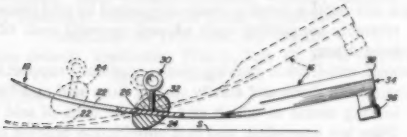
means pivotally connecting said levers to each other such that, when the rear ends of said levers are brought together, the forward ends of said levers are spread apart for exerting a force against said nail and extracting said nail from the surface within which said nail is embedded.

4,042,210

ADJUSTABLE LEVERAGE PRY BAR

William F. Feldmann, R.R. No. 1, O'Fallon, Ill. 62269

Filed June 29, 1976, Ser. No. 700,855
Int. Cl.[2] B66F *3/00*
U.S. Cl. 254—26 R **3 Claims**



1. An adjustable leverage pry tool, comprising, in combination:

a. a lever including a pry portion and a handle portion;

b. a claw provided on the pry portion; and

c. a fulcrum member adjustably, slidably mounted on the pry portion and arranged movable between the handle portion and the claw for varying the amount of leverage exerted by the lever, the fulcrum member having a substantially elliptical transverse cross section for enhancing the leverage of the lever, the pry portion extending longitudinally from the handle portion to the claw, and being in the form of a longitudinal arcuate member arranged for varying the angle of leverage as well as the amount of leverage by movement of the fulcrum member between the handle portion and the claw, the fulcrum member including, in combination:

1. an elongated member provided with a slot in which the arcuate member of the pry portion is slidably received; and

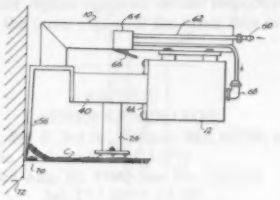
2. clamp means attached to the elongated element for releasably securing the elongated element to the arcuate member, the clamp means including a thumbscrew, and a threaded bore provided in the elongated element, the thumbscrew disposed movably threadingly engaged in the bore and releasably gripping the arcuate member.

4,042,211

PORTABLE DEVICE FOR STRETCHING AND INSTALLING CARPET

John M. Hammond, P.O. Box 248, Lugoff, S.C. 29078, and Haskell R. Brown, Jr., 93D Georgetown Apt., 1476 Orange Grove Road, Charleston, S.C. 29401

Continuation of Ser. No. 555,936, March 6, 1975, abandoned.
This application Mar. 22, 1976, Ser. No. 669,293
Int. Cl.[2] A47G *27/04*
U.S. Cl. 254—57 **11 Claims**



1. A portable carpet stretching device for stretching carpet and the like over a floor surface for attachment to a fastening member secured to the floor surface closely adjacent a vertical wall comprising:

a. an elongated member positioning said device over said floor surface;

b. cylinder means carried by said elongated member having a piston assembly slideably carried therein for being actuated by a source of pressurized fluid;

c. said piston assembly including a piston and a piston rod carried thereby, said piston rod extending through an end of said cylinder means having a leg member depending therefrom,

d. carpet engaging means carried by said leg member for engaging carpet to be installed,

e. a support member depending from said elongated member being receivable behind said fastening member to which the carpet is to be attached,

f. a supply line for connecting said pressurized fluid source with said cylinder means, and

g. adjustable control means connected in said supply line controlling the admission and venting of pressurized fluid in said cylinder means so as to adjustably control the movement of said piston assembly,

said piston assembly being moved towards said support member during admission of pressurized fluid to said cylinder means so as to stretch the carpet engaged by said leg member a controlled amount towards said support member.

4,042,212

CABLE HAULING APPARATUS

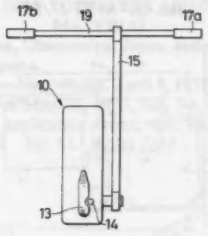
Johannes Augustus Rinio, 5, Promenade Venesia, Grand Siede, 7800 Versailles, France

Continuation of Ser. No. 490,977, July 23, 1974, abandoned.
This application Apr. 7, 1976, Ser. No. 674,441
Int. Cl.[2] A63B *61/04*
U.S. Cl. 254—164 **3 Claims**

1. In a cable hauling apparatus having oppositely movable clamp jaws mounted in two blocks that are oppositely longitudinally movable by at least one generally vertically extending lever connected to a laterally extending drive shaft to alternatively clamp a cable normally extending longitudinally through the apparatus and advance same longitudinally with respect to the apparatus, the improvement comprising:

said drive shaft having at least one end extending beyond one side of the apparatus, said hand lever being rigidly secured to said one end of the drive shaft on one side of the apparatus and extending generally vertically beyond the top of the apparatus at its distal end, the hand lever being pivotally movable in a vertical, longitudinal plane to

actuate the drive shaft about its axis; a transverse rod secured to the lever intermediate the ends of the rod adjacent the distal end of the lever, the transverse rod extending generally parallel to the drive shaft transversely of the apparatus, one end of the rod extending substantially beyond the side of the apparatus opposite the side beyond which the one end of the drive shaft extends, the



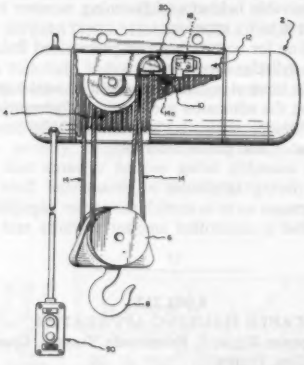
opposite end of the rod extending substantially beyond the lever in the opposite direction; and handle grip means at each end of the transverse rod, whereby two individual operators standing on opposite sides of the apparatus can simultaneously apply full manual actuating force to the drive shaft of the apparatus through the grips, rod and lever without interfering with each other.

4,042,213

ELECTRIC HOIST

Kenneth D. Schreyer, Clarence; Earl T. Leverentz, North Tonawanda, and Thomas R. Nusz, Amherst, all of N.Y., assignors to Columbus McKinnon Corporation, Tonawanda, N.Y.

Filed June 4, 1976, Ser. No. 692,963
Int. Cl.[2] B66D *1/00*
U.S. Cl. 254—168 **6 Claims**



1. In a multiple-reeved electric hoist having a frame and wherein dead end of the load carrying cable or chain is attached to said hoist frame, an improved combination overload snubbing and overload sensing and motor control mechanism;

said overload snubbing mechanism including a load snubbing spool positionally affixed to a first portion of said hoist frame and having a generally arcuate shaped slipper shoe frictionally journaled thereon for retarded oscillation thereabout, the hoisting cable or chain being arranged in training relation around said slipper shoe, and a first spring device mounted in association with said slipper shoe and operable to resiliently bias said slipper shoe to remain in a normal centralized position relative to said spool;

said overload motor control mechanism comprising a motor power supply control switch unit positionally affixed to said hoist frame;

said overload sensing mechanism comprising a second spring device which is bottomed against a second portion of said hoist frame;

the extreme dead end portion of said cable or chain being arranged to terminate in operable connection with the displaceable portion of said second spring device; and

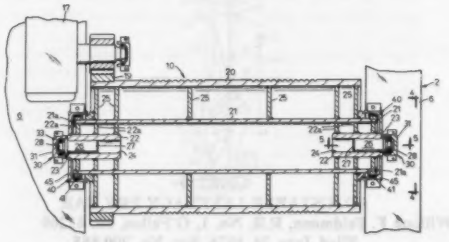
a switch actuating arm rigidly extending from the displaceable portion of said second spring device and operatively associated with said control switch unit so as to actuate the latter to deenergize the hoist motor whenever a hoist overload is transmitted to the mechanism through the hoist cable or chain.

4,042,214

OVERHEAD CRANE INCLUDING AN IMPROVED HOIST DRUM AND REDUNDANT HOIST DRUM SUPPORT MEANS

Richard F. Brener, Wauwatosa, Wis., assignor to Harnischfeger Corporation, West Milwaukee, Wis.

Filed Apr. 26, 1976, Ser. No. 680,133
Int. Cl.[2] B66D *1/00*
U.S. Cl. 254—186 R **8 Claims**



1. In an overhead crane:

a frame;

a hoist drum having opposite ends;

first anti-friction bearing means supported by said frame and rotatably supporting each of said opposite ends of said hoist drum;

second anti-friction bearing means rotatably supported on said hoist drum and axially spaced from said anti-friction bearing means in which said opposite ends of said hoist drum are journalled, said first anti-friction bearing means supporting said second anti-friction bearing means out of supporting engagement with said frame, and means supported by said frame for supporting said second anti-friction bearing means upon failure of said first anti-friction bearing means, said means for supporting said second anti-friction bearing means including a supporting surface spaced below said second anti-friction bearing means when said hoist drum is supported by said first anti-friction bearing means and for receiving said second anti-friction bearing means in supporting engagement upon downward movement of said hoist drum upon failure of said first anti-friction bearing means.

4,042,215

WINCH CONTROL MECHANISM

Dewey R. Hakes, Geneseo, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Feb. 24, 1975, Ser. No. 552,091
Int. Cl.[2] B66D *1/00*
U.S. Cl. 254—187.4 **2 Claims**

1. A pilot control mechanism for a power train including interrelated first and second hydraulically operable motor means, said first motor means operable to permit reeling out of a cable around a drum, and said second motor means operable to reel in said drum the pilot control mechanism comprising

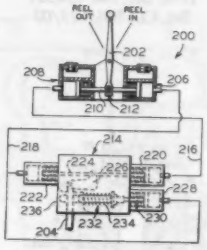
a pilot controlled lever being pivotably movable in a first

direction for actuating the first motor means and in a second direction for actuating the second motor means,

a manual control lever also being pivotably movable in first and second directions,

first and second master cylinder means being coupled with the manual control lever,

first and second slave cylinder means being coupled with the pilot controlled lever and being in direct fluid communication with the first and second master cylinder means, and



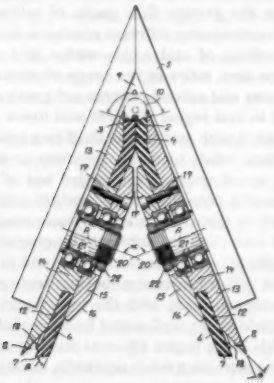
accumulator means, also being in direct fluid communication with only one of the master cylinder means, to produce a resilient load upon movement of the manual control lever in its first direction, the accumulator means providing increased resistance to movement of the control lever in the first direction in relation to movement of the lever in the second direction so that a differential modulated control is provided over the first and second motor means with proportional feedback forces being developed in the manual control lever.

4,042,216

CABLE GUIDE

Jean Maraux, Saint-Amand-Montrond, France, assignor to Willy Habegger, Hunibach bei Thun, Switzerland

Filed July 16, 1975, Ser. No. 596,251
Claims priority, application France, July 18, 1974, 74.25011
Int. Cl.² B66D *1/36*
U.S. Cl. 254—190 R **9 Claims**



1. A cable guide comprising:

a support defining a pair of intersecting pivot axes inclined to the horizontal;

a pair of spaced-apart wheels each rotatable on said support about a respective one of said axes and each having an inside face turned toward the inside face of the other wheel, said inside faces approaching each other most closely at a location above the intersection of said axes and being spaced apart at said location by a predetermined distance, said wheels defining a gap adapted to clear a load-supporting arm suspended by a cable at said location; and

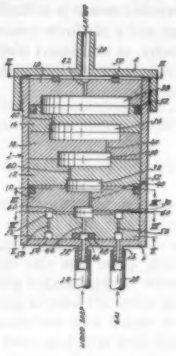
an elastomeric disk secured to the inside face of each wheel and having an outer rim of a thickness equal to at least half said predetermined distance, said disks being resiliently compressed together at said location by said wheels and said outer rims forming at said location an upwardly open cable-receiving groove, each of said faces having a frustoconical outer region centered on the respective axis and parallel to the outer region of the other face at said location.

4,042,217

LATHER GENERATOR

John H. Snider, 506 S. 3rd St., Clinton, Mo. 64735, and Harold H. Snider, Rte. 2, Osceola, Mo. 64776

Filed Aug. 18, 1976, Ser. No. 715,524
Int. Cl.² B01F *15/00*
U.S. Cl. 259—4 AB **8 Claims**



1. A lather generator comprising:

a. a housing having a pair of inlets respectively for liquid soap and gas, and an outlet for lather generated therein, and

b. means carried in said housing and forming a series of open chambers, the first chamber of said series being of smaller volume than any other of said chambers, means operable to direct soap and gas delivered under pressure to said inlets into said first chamber of said series, and to intermix them thoroughly in said first chamber, under substantially elevated pressure whereby to inhibit growth of the size of the gas bubbles thereby formed in said liquid soap, restricted passageways interconnecting said chambers in series, and a passageway interconnecting the final chamber of said series to said housing outlet.

4,042,218

APPARATUS FOR MIXING FLUIDS HELD IN TUBES

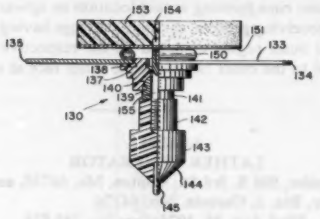
Robert R. Moore, Glenview, and Vincent E. Eitzen, Evanston, both of Ill., assignors to American Hospital Supply Corporation, Evanston, Ill.

Division of Ser. No. 407,809, Oct. 19, 1973, Pat. No. 3,975,001.
This application Apr. 5, 1976, Ser. No. 673,602
Int. Cl.² B01F *9/02*
U.S. Cl. 259—72 **2 Claims**

1. In combination, apparatus for varying the intensity of stirring motion of a fluid in a container such as a test tube including outer casing means; a generally upright tubular housing; cup means slidably recieved in said housing; spring means resiliently urging said cup means to an upper position within said housing; drive means for driving the lower portion of said

housing in orbital motion; and gimbal mounting means for mounting the upper portion of said housing; and

an appliance removably attachable to said apparatus and comprising bracket means (for movably attaching to said apparatus) removably secured to said casing means; an insert carried by said bracket means and universally mov-



able relative thereto for insertion into said cup means when said bracket means is assembled to said (apparatus) casing means; and a platform connected to said insert and (rotated thereby, as said insert is rotated when said cup is driven in rotary motion) vibrated by said insert as said housing is driven.

4,042,219

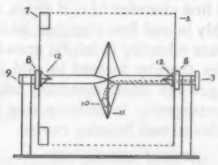
MECHANICAL AEROBIC COMPOSTER

Morris B. Terry, R.D. No. 1, Gilbertsville, N.Y. 13776

Filed Feb. 18, 1976, Ser. No. 636,940

Int. Cl.[2] B01F *9/02*

U.S. Cl. 259—88 **4 Claims**



1. Composting apparatus comprising: a rotatable enclosure means of generally elongated shape and including side walls and end walls defining a general cylindrical internal space, said enclosure means having one closeable access aperture, and said enclosure means being perforated with a plurality of holes; agitation means within said enclosure means consisting of a hollow shaft to which are secured three vanes, said vanes consisting of a central, octahedral vane and two tetrahedral vanes which tetrahedral vanes are affixed, respectively, to each end of said shaft, said vanes positioned so that the central, octahedral vane is perpendicular to the tetrahedral vanes, said shaft being journally supported by said enclosure means end walls axially through said cylindrical internal space.

4,042,220

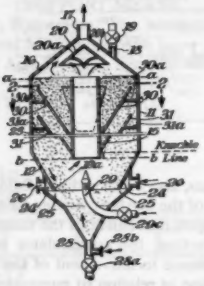
APPARATUS FOR SOLIDS BLENDING

Robert Garnett Humkey; Donald Raymond Marshall, both of Orange, and Donald James Ryan, Nederland, all of Tex., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 618,888, Oct. 2, 1975, abandoned, which is a continuation-in-part of Ser. No. 439,847, Feb. 6, 1974, abandoned, which is a division of Ser. No. 267,200, June 28, 1972, Pat. No. 3,807,705. This application Aug. 17, 1976, Ser. No. 714,997

Int. Cl.[2] B01F *13/02*

U.S. Cl. 259—95 **10 Claims**



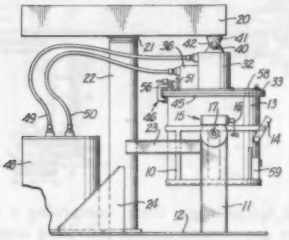
1. A particulate solids blending apparatus comprising, in combination, a vessel containing a settled bed of particulate solids to be blended consisting of an upright top section to which is joined a funnel type bottom section, a draft tube vertically disposed with respect to said top section with lower end in open communication with said funnel type bottom section and upper end in open communication with the top of said top section, means fluidizing a well-mixed fraction of about 0.01 to 0.20 of said solids in the region adjacent said lower end of said draft tube, means entraining solids upwardly through said draft tube, and solids flow-constricting means spaced inwardly from the inside wall of said upright top section disposed in the gravity flow paths of solids contained within said bed maintaining different residence times of separate weight fractions of said solids within said settled bed having residence time ratios in the range of about 1.5 to 5.0 while withdrawing said solids in downward gravity flow from said settled bed to said region adjacent said lower end of said draft tube provided with said means fluidizing solids.

2. A particulate solids blending apparatus comprising, in combination, a vessel containing a settled bed of particulate solids to be blended consisting of an upright cylindrical top section to which is joined an inverted frusto-conical bottom section, a draft tube disposed substantially coaxially with respect to said cylindrical section with lower end in open communication with said frusto-conical bottom section and upper end in open communication with the top of said cylindrical section, means fluidizing a well-mixed fraction of about 0.01 to 0.20 of said solids in the region adjacent said lower end of said draft tube, means entraining solids upwardly through said draft tube, and solids flow-constricting means spaced inwardly from the inside wall of said upright top section disposed in the gravity flow paths of solids contained within said bed maintaining different residence times of separate weight fractions of said solids within said settled bed having residence time ratios in the range of about 1.5 to 5.0 while withdrawing said solids in downward gravity flow from said settled bed to said region adjacent said lower end of said draft tube provided with said means fluidizing solids.

4,042,221
TILT MIXER

Claude K. Myers; Gary A. Myers, and Phillip C. Myers, all of 8376 Salt Lake Ave., Bell, Calif. 90201

Filed Apr. 22, 1974, Ser. No. 463,109
Int. Cl.[2] B01F 7/00
U.S. Cl. 259—119 6 Claims



1. In an impeller type mixer, the combination of:

a cylindrical container having an axis and an open top and being supported on a first support means;

said first support means for said container mounted on a flat horizontally extending base plate;

said first support means comprising a pivotally mounted cradle type member connected to an upright base member and having at least one pair of parallel, horizontal, circular bands connected together at intervals around the circumference thereof by vertical connecting straps with a clamp thereon holding said container upright in place in said cradle member, said container being positionable in and laterally removable from said first support means;

a cover for said container for closing said open top;

at least one impeller and hydraulic drive motor mounted on said cover, with said impeller projecting into said container when said cover is mounted thereon;

a second support means for said cover, said second support comprising a vertical telescopic, hydraulic cylinder and piston having attached at the top thereof a horizontal elongate frame member, said cover, impeller and drive motor being suspended from and connectible to and disconnectible from said frame member of said second support;

said hydraulic cylinder and piston being capable of moving between upper and lower positions when said container axis is in the vertical position, with said impeller lifted clear of said container when said cover is connected to said second support and said second support is in said upper position;

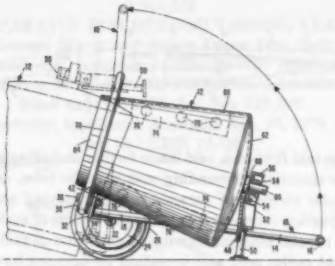
a tilting mechanism connected between said base member and said first support means and being capable of tilting said first support means with said container therein and with said cover on said container and without said cover, said cover when on said tilted container being disconnected from said frame member to permit tilting of said frame member and cover, and said cover when not on said tilted container being connected to said frame member and lifted clear of said container by said cylinder and piston, said motor and impeller being operable when said cover is on said container both when said container axis is vertical and tilted; and

a hydraulic power source mounted on said base plate with flexible hydraulic conduits leading from said power source and supplying power to said drive motor.

4,042,222
MIXER

Andrew B. Clement, 1623 Stonecliff Drive, Decatur, Ga. 30033

Continuation-in-part of Ser. No. 616,371, Sept. 24, 1975. This application Sept. 2, 1976, Ser. No. 719,971
Int. Cl.[2] B28C 5/20
U.S. Cl. 259—176 16 Claims



1. A mixer comprising:

frame means having first and second ends and a longitudinal frame axis,

a pair of frame wheels for transporting the mixer mounted at said first end of said frame means parallel to said frame axis,

handle means mounted on said second end of said frame means,

a pair of mixing barrel support wheels rotatably mounted on said frame means at said first end thereof, said pair of support wheels being spaced from one another laterally flanking said frame axis and being generally vertically oriented, said mixing barrel support wheels having annular grooves extending around the entire periphery thereof,

bearing means mounted on said frame means along said frame axis spaced from said first end, said bearing means having a bearing opening for receiving a mixing barrel shaft,

a mixing barrel of generally frustoconical shape having side walls, a base, and an opening opposite said base, a mixing barrel shaft attached to said base along a mixing barrel axis and engageable with said bearing means,

a circular handle ring mounted on said mixing barrel surrounding said mixer opening, said handle ring being mounted on arm means attached to said mixing barrel and spacing said handle ring radially from said mixing barrel, the axis of said ring being coincident with the axis of said mixing barrel, said ring being engageable with said grooves in said mixing barrel support wheels and functioning to support said mixing barrel and to be grasped by the operator to rotate said mixing barrel.

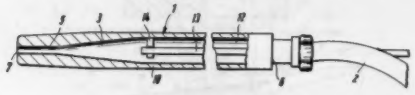
4,042,223
ARRANGEMENT FOR AND A METHOD OF INTRODUCING PARTICULATE MATERIAL INTO MOLTEN BATHS

Hans Jürgen Langhammer, Platjenwerbe; Horst Abratis, Hagen; Klaus Schäfer, Georgsmarienhütte; Klaus-Jürgen Rendel, Georgsmarienhutte, and Horst Lotze, Georgsmarienhutte, all of Germany, assignors to Klockner-Werke AG, Duisburg, Germany

Filed June 24, 1976, Ser. No. 699,640
Claims priority, application Germany, June 27, 1975, 2528672
Int. Cl.[2] C21C 7/00
U.S. Cl. 266—47 19 Claims

1. An arrangement for introducing particulate materials into molten baths comprising, in combination, means for containing a molten bath; a source of a suspension of a particulate material in a carrier medium; means for conveying the suspension from said source toward said containing means; and an elongated

lance partially immersed in the molten bath and including a metallic tube having an inlet port communicating with said conveying means outside of the molten bath, an outlet port longitudinally spaced from said inlet port, having a first flow-through cross-sectional area and communicating with the molten bath, an annular recess around said outlet port, and a passage communicating said inlet port with said outlet port and having a second flow-through cross-sectional area which is



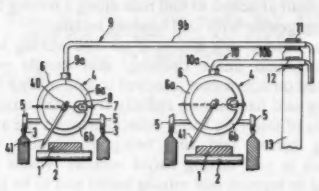
larger than said first area, said lance further including a layer of refractory material surrounding said metallic tube, and a discrete tubular element of ceramic material having an annular shoulder portion received in said annular recess of said metallic tube, said tubular element forming an extension of said metallic tube at said outlet port and bounding an opening having said first area and communicating with said outlet port and said molten bath.

4,042,224

THERMAL CUTTING MACHINE FOR CUTTING UP CAST INGOTS DURING THE OPERATION OF CONTINUOUS CASTING PLANT

Juan Adalberto Zeley, Caracas, Venezuela, assignor to I.P.U. Limited, Nassau, Bahamas

Filed Dec. 16, 1975, Ser. No. 641,345
Claims priority, application Germany, Dec. 16, 1974, 2459410
Int. Cl.² B23K 7/00
U.S. Cl. 266—50 **9 Claims**



1. A thermal cutting machine for cutting a continuously cast ingot moving in a longitudinal direction comprising:

rail means for longitudinally movably supporting said machine at a position spaced from and parallel to said ingot;

means for clamping said machine to said ingot whereby said machine moves along said rail means in unison with said ingot;

a cutting burner;

means for moving said cutting burner transversely across said ingot to thereby cut said ingot;

an outer cooling shroud substantially enclosing said cutting machine, said cooling shroud having double walls in a spaced relation and adapted to receive a cooling fluid therebetween; and

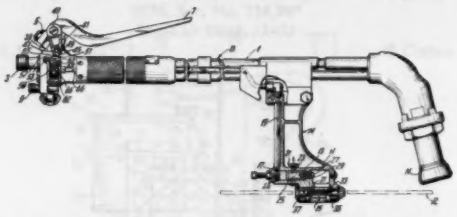
articulated pipe means coupled at one end to said cooling shroud and adapted both to supply a cooling fluid from an external source between said walls and to remove cooling fluid already present between said walls.

4,042,225

TORCH WITH GAS ACTUATED STARTING ROD FEED DEVICE

Richard Calvin Jones, Scio, Ohio, and Clifford Charles Anthes, Tucson, Ariz., assignors to Union Carbide Corporation, New York, N.Y.

Filed Sept. 17, 1976, Ser. No. 724,359
Int. Cl.² B23K 7/10
U.S. Cl. 266—75 **4 Claims**



1. A hand holdable gas torch, comprising a torch body having a first gas passage therein providing communication between a source of gas and a torch nozzle mounted at one end of said torch body, a starting rod feed mechanism mounted on said torch body and comprising a housing having an exhaust port therein; a piston in said housing sealing said exhaust port; a rod gripper connected to said piston for parallel movement therewith; second gas passage means providing communication between one side of said piston and said first gas passage; valve means located in said second gas passage for providing a pulse of gas to said piston, said valve means having a valve stem for opening said valve; means for operating said valve means in one direction only, including a torch lever pivotally mounted to the torch body, a lever arm extension pivotally mounted to said torch lever; a cam operator pivotally and resiliently mounted at one end of said lever arm extension; a cam lever pivotally mounted to the torch body and in operable relationship to said cam operator so that only when said torch lever is depressed the cam operator drives the cam lever into contact with said valve stem causing a pulse of gas to flow through said second gas passage to one side of said piston thereby driving said piston until said exhaust port is opened whereupon said pulse of gas is exhausted to atmosphere so that the rod advances the starting rod a distance equal to the stroke of the piston and the rod gripper is immediately reset for another stroke.

4,042,226

METHOD AND APPARATUS FOR PRODUCING METALLIC IRON PELLETS

Donald Beggs, Charlotte, N.C., assignor to Midrex Corporation, Charlotte, N.C.

Filed May 19, 1975, Ser. No. 578,477
Int. Cl.² F27B 9/00
U.S. Cl. 266—88 **5 Claims**

1. Apparatus for reducing a metal oxide, comprising:

a. a generally vertical shaft furnace adapted to receive a bed of metal oxide and having a gas inlet and a gas outlet, with at least a portion of said bed being positioned intermediate said inlet and said outlet and forming a reduction zone therebetween;

b. means for cooling gas removed from said furnace via said gas outlet;

c. a passageway communicating between said gas outlet and said cooling means;

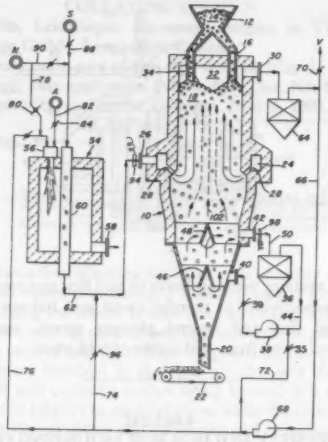
d. a cooling gas system connected to said cooling means by a second passageway, said cooling gas system including:

1. a cooling gas inlet for introducing a cooling gas to said furnace below said reduction zone;

2. means including a cooling gas outlet for removing part of said cooling gas from said furnace above said cooling gas

inlet, the portion of said furnace between said cooling gas inlet and said cooling gas outlet forming a cooling zone;

3. means for cooling said cooling gas removed from said furnace;



4. a third passageway communicating between said cooling gas outlet and said means for cooling said cooling gas; and

5. a fourth passageway communicating between said means for cooling said cooling gas, said second passageway and said cooling gas inlet.

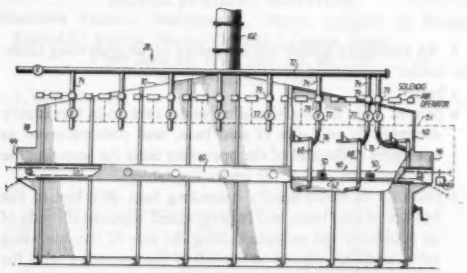
4,042,227
METHOD AND APPARATUS FOR CONTINUOUSLY HOMOGENIZING AND QUENCHING ALUMINUM BILLETS

Howard E. Niehaus; Winfield M. Hass; Homer G. Alpha, all of Owensboro, Ky.; Sidney B. Hall, Tiburon, Calif., and Frederick O. Traenkner, Pittsburgh, Pa., assignors to Southwire Company, Carrollton, Ga. and National Steel Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 344,626, March 26, 1973, abandoned. This application July 23, 1975, Ser. No. 598,236

Int. Cl.² C21D *9/08*

U.S. Cl. 266—93 **14 Claims**



1. Apparatus for homogenizing and quenching cast metal billets comprising a furnace and a quench chamber disposed in contiguous relation thereto, conveyor means defining a path of travel for billets through said quench chamber, spray cooling means including a plurality of concentrically arranged continuously annular spray rings disposed in spaced relation along and surrounding said path of travel and adapted to have billets pass therethrough, said spray rings being connected to a manifold pipe adapted to supply cooling fluid to said spray rings, said conveyor means including a plurality of support rollers fixedly mounted in said chamber between successive ones of each of said plurality of annular spray rings for supporting the billets during quenching to thereby inhibit warpage thereof, and means for simultaneously adjusting the vertical position of each of said spray rings independently of said quench chamber and said support rollers so as to position said spray rings concentrically with respect to the axes of billets of different diameters supported on said support rollers and adapted to pass through said spray rings.

4,042,228
APPARATUS FOR DEBISMUTHISING LEAD

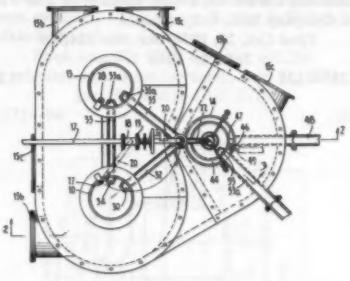
Denby Harcourt Ward, and James Dixon Iley, both of Port Pirie, Australia, assignors to The Broken Hill Associated Smelters Proprietary Limited, Melbourne, Australia

Filed Aug. 18, 1976, Ser. No. 715,298

Claims priority, application Australia, Aug. 19, 1975, 2844/75

Int. Cl.² C22B *13/06*

U.S. Cl. 266—215 **14 Claims**



1. Apparatus for debismuthising lead containing one or more alkaline earth metals or alloys thereof, which comprises a separation vessel having an upper liquation zone and a lower separation zone, means for independently controlling the temperature of each zone, means for adding a reagent selected from the group consisting of antimony, arsenic and alloys containing antimony and/or arsenic, to the input lead to form a crust/bullion mixture, means for continuously introducing the crust/bullion mixture directly into the lower separation zone of the vessel, at a point below the upper liquation zone, the crust particles being separated from the bullion in the lower separation zone and moving upwardly in the vessel, the entrained lead being separated from the crust particles in the upper liquation zone and moving downwardly in the vessel, means for removing the enriched crust from the upper surface of the material in the vessel, and means for withdrawing debismuthised product lead from near the lower end of the lower separation zone.

4,042,229
TUNDISH WITH WEIRS

Kenneth Thomas Eccleston, Birmingham, England, assignor to Foseco Trading A.G., Chur, Switzerland

Filed June 8, 1976, Ser. No. 693,958

Claims priority, application United Kingdom, June 17, 1975, 25858/75

Int. Cl.² C21C *5/00*

U.S. Cl. 266—275 **9 Claims**

1. A tundish comprising

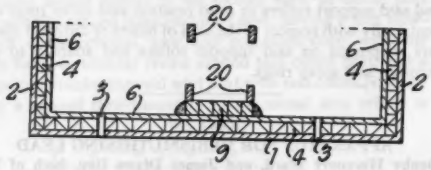
a casing having a floor including an impact area and upstanding sidewalls including two sidewalls at either end of said impact area;

a permanent refractory lining for said casing;

a pair of expendable preformed slabs of refractory heat-insulating material disposed on said two sidewalls at either end of said impact area,

means for providing a weir at said impact area and for supporting said preformed expendable slabs to hold them on

said two sidewalls, said means comprising at least one expendable beam of refractory heat insulating material



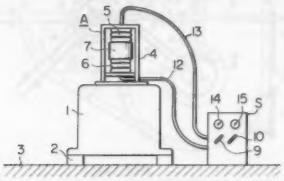
extending between opposite sides of said casing adjacent said impact area and abutting each of said preformed slabs.

4,042,230

DYNAMIC ABSORBER WITH PNEUMATIC SPRINGS

Masao Akimoto, Hiratsuka, Japan, assignor to The Yokohama Rubber Company Ltd., Tokyo, Japan

Filed Oct. 22, 1975, Ser. No. 624,909
Int. Cl.[2] F16F *9/02*
U.S. Cl. 267—136 **12 Claims**



1. A dynamic absorber adaptd for use in cancelling a vibration of a machine which is caused by a vibration excitation force generated in the machine, comprising:

a pair of pneumatic means each including an elastically variable volume container disposed to be spaced apart from one another and effecting a spring action along a predetermined line, respectively;

a weight means supported between said pair of pneumatic means and capable of vibrating between said pair of pneumatic means along said predetermined line;

an air pipeline circuit connectable to a pressurized air source for supplying pressurized air from said pressurized air source to said pneumatic means, and;

at least one pressure regulating valve disposed in the air pipeline circuit for remotely and adjustably regulating the pressure of the pressurized air supplied to said pneumatic means.

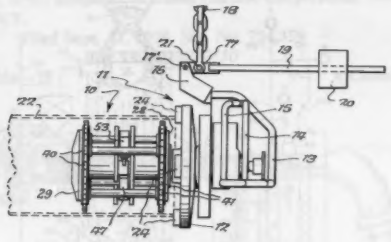
4,042,231

PIPE CLAMPING DEVICE

John F. Kopczynski, and Paul F. Kluczynski, both of North Tonawanda, N.Y., assignors to CRC - Automatic Welding, Division of Crutcher Resources Corporation, Houston, Tex.

Filed May 21, 1976, Ser. No. 688,676
Int. Cl.[2] B23P *19/00*
U.S. Cl. 269—48.1 **18 Claims**

1. A device for clamping into engagement with the inside of a pipe comprising a continuous central supporting shaft, first and second axially spaced rotatable actuator means having first and second cylindrical portions, respectively, journalled on said shaft, first and second frame means fixedly secured to said shaft proximate said first and second rotatable actuator means, respectively, a plurality of first and second plunger means spaced circumferentially about said shaft, mounting means mounting said first and second plunger means on said first and second frame means, respectively, for movement toward and away from said inside of said pipe, first and second linkage means coupling said first and second plunger means, respectively, to said first and second rotatable actuator means, respectively, and motor means coupled to said first and second rotatable actuator means for rotating said first and second



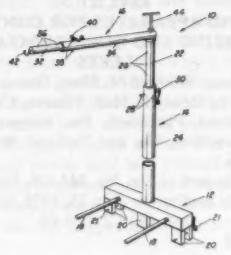
rotatable acutator means relative to said first and second frame means, respectively, to thereby cause said linkage means to move said first and second plunger means, respectively, toward and away from said inside of said pipe.

4,042,232

EXTREMITY HOLDER FOR MOUNTING ON AN OPERATING TABLE

Barbara A. Lile; Robert M. Lane, both of Wichita, and Louise A. Everhart, Derby, all of Kans., assignors to L. E. L., Inc., Wichita, Kans.

Filed Oct. 12, 1976, Ser. No. 731,320
Int. Cl.[2] A61G *13/00*
U.S. Cl. 269—328 **2 Claims**



1. An extremity holder for mounting on an operating table, the holder comprising:

a base;

a pair of rods having threaded ends, said rods threadably mounted to one side of said base, said rods received in apertures in the end of the operating table for securing the holder to the end of the operating table;

a plurality of downwardly extending lugs attached to the bottom of said base, said lugs received adjacent the side of an accessory rail mounted along the side of the operating table, said lugs pinned to the rail of the operating table for securing the holder to the side of the operating table;

a vertical standard having an inner tube slidably mounted inside an outer tube, said tubes having a plurality of apertures therethrough for receiving a pin therein for adjusting the vertical heighth of said standard;

a horizontal arm having an outer tube and an inner tube, said inner tube slidably mounted inside said outer tube, said tubes having a plurality of apertures therethrough for receiving a pin therein for adjusting the horizontal length of said arm; and

a hook attached to one end of said arm, said hook used for holding a sling attached to a patient on the operating table.

4,042,233

INSTALLATION FOR COLLECTING IDENTICALLY SHAPED, LARGE AND DIFFERENT TYPES OF SHEETS FROM A PLURALITY OF DISPENSING STATIONS AT A COLLATING STATION

Hilmar Vits, Leichlingen, Germany, assignor to VITS-Maschinenbau GmbH, Langenfeld, Germany

Continuation-in-part of Ser. No. 466,258, May 2, 1974, abandoned. This application Feb. 3, 1976, Ser. No. 654,737
Claims priority, application Germany, May 9, 1973, 2323339
Int. Cl.[2] B65H *39/055*
U.S. Cl. 270—58 9 Claims

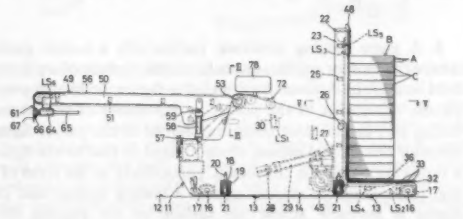
2. Apparatus for collecting and stacking a plurality of identically shaped sheets comprising: a collating station for collecting and stacking the sheets; at least one pair of sheet dispensing stations positioned on each of two opposite sides of said collating station, each of said sheet dispensing stations being adapted to store sheets identical in size and weight, said dispensing stations and said collating station being located in a row uniformly spaced relative to each other; movable sheet-conveying carriage positioned above said dispensing and collating stations and driving means for incrementally reciprocating said carriage to and fro above said row of stations at an incremental amplitude corresponding to the spatial distances between said stations for transporting said sheets in a direction toward said collating station; individually controllable gripper elements mounted on said carriage at predetermined locations and having means for simultaneously gripping one sheet from at least one of each of said pair of opposed dispensing stations at an edge of the sheet leading in the direction of motion toward the collating station; means lowering said gripper elements for gripping the sheets, whereby the sheets thus gripped are conveyed sequentially from the dispensing stations towards said collating station for stacking thereon, each of said gripper elements being controlled individually for building up stacks of different order, the sheets being collated by transporting the sheets from one dispensing station to the other, the sheets being transported step-by-step in the direction toward said collating station.

4,042,234

BLANK FEEDING MACHINE

Masateru Tokuno, Nishinomiya, Japan, assignor to Rengo Kabushiki Kaisha, (Rengo Co. Ltd.), Osaka, Japan

Filed June 18, 1976, Ser. No. 697,733
Int. Cl.[2] B65H *1/30*
U.S. Cl. 271—151 8 Claims



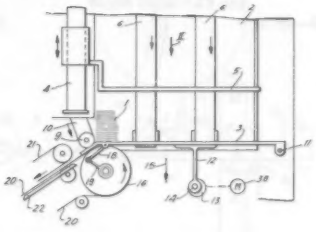
1. A blank feeding machine delivering blanks in bundles on a belt conveyor to a feed hopper of a printer comprising a truck movable on at least one pair of rails, a pivoting frame mounted to said truck in the rear thereof to be pivoted forward from its upright position by at least one driving means and provided with a table at the bottom thereof to stack blanks thereon, at least one kicker vertically movably mounted on said pivoting frame for pushing up the stack of blanks intermittently according to the rate at which blanks are fed to the feed hopper, when said pivoting frame is in its pivoted position, a first belt conveyor provided in front of said truck to extend forward therefrom with the rear end thereof adjacent to the front end of said pivoting frame in its pivoted position for delivering the blanks transferred in bundles from said pivoting frame with one side thereof held by the worker, and a second belt conveyor mounted to the pivoting frame to be disposed outside of the boundary between the front end of the pivoting frame in its pivoted position and the rear end of said first belt conveyor for carrying the bundles of blanks forward with only the outer side thereof supported thereon when they are transferred from the pivoting frame to said first belt conveyor.

4,042,235

METHOD OF AN APPARATUS FOR UNSTACKING A PILE OF SHEETS

Rudolf Wanner, Aystetten, and Robert Eckl, Augsburg, both of Germany, assignors to Fa. Bowe, Bohler & Weber KG Maschinenfabrik, Augsburg, Germany

Filed Aug. 20, 1975, Ser. No. 606,206
Claims priority, application Germany, Aug. 21, 1974, 2440104
Int. Cl.[2] B65H *3/08, 3/10*
U.S. Cl. 271—94 10 Claims



1. A method of unstacking a pile of sheets comprising the steps of:

a. urging said pile continuously toward a flat rigid unperforated plate covering substantially the entire surface of a sheet at an end of the pile so that said end sheet of the pile presses against said plate;

b. pulling said plate away from said end sheet of said pile with a speed sufficient to separate said end sheet from the next sheet of said pile by an adhesion created only by the contact of said plate with said end sheet and the movement of said plate away from the pile, said speed being in excess of the speed at which said pile is urged toward said plate;

c. thereafter withdrawing said end sheet laterally parallel to said plate from said pile;

d. thereafter displacing said plate back against said pile whereby the next sheet of said pile becomes the end sheet; and

e. repeating steps (b), (c), and (d) with the subsequently uncovered end sheets.

4,042,236

TENNIS GAME METHOD AND APPARATUS

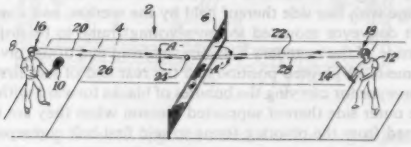
Dale Alan LePrevost, 4 Silver Terrace, Ocala, Fla. 32670

Filed May 21, 1975, Ser. No. 579,412
Int. Cl.[2] A63B *61/00*
U.S. Cl. 273—29 R 9 Claims

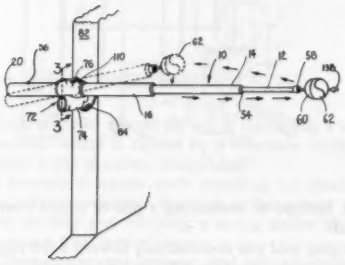
3. A game tracking apparatus for a moving projectile for playing a game in the darkness comprising:

a generally retro-reflective projectile for providing the gaming projectile,

a visual output means for producing a visual output, said visual output means includes an output element for producing the visual output, a power source connected to

said element, and a supporting means connected to said element and power source, said supporting means positioned adjacent a player, said visual output means positionable by the player in relation to said retro-reflective projectile as the projectile moves in flight to provide a

retroreflective beam, whereby said visual output is intense enough to provide a visible retro-reflective beam from said retro-reflective projectile back to the player's eyes to allow the player to track the movement of said retro-reflective projectile in the darkness for gaming purposes.

4,042,237
TENNIS TRAINER
Cornel Moraru, 19 W. 55 St. PH-1, New York, N.Y. 10019
Filed June 24, 1976, Ser. No. 699,603
Int. Cl.[2] A63B *69/38*
U.S. Cl. 273—29 A **21 Claims**

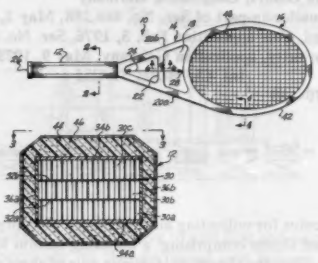


17. A tennis trainer comprising a telescoping shaft assembly having first, second and third shafts, said first shaft telescoping into said second shaft and said second shaft telescoping into said third shaft, a tennis ball mounted on said first shaft, resilient means mounted internally of said third shaft for receiving the force of said first and second shafts when the tennis ball is struck and for returning the first and second shafts towards their fully extended positions, and means for supporting said third shaft.

4,042,238
RACKET
Maurice N. Theriault, Renton, Wash., assignor to Composite Structures Corporation, Kent, Wash.
Filed Jan. 27, 1975, Ser. No. 544,299
Int. Cl.[2] A63B *51/10*
U.S. Cl. 273—73 C **12 Claims**

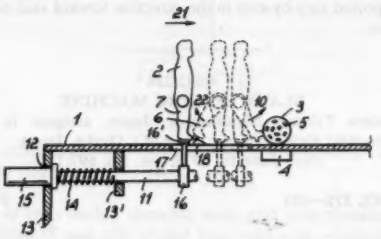
3. A racket with a handle, a throat and an open oval frame having netting stretched therein, the racket comprising: a handle; an oval frame; a throat section connecting the handle and the oval frame formed with a pair of arms extending from the handle to merge into opposite sides of the oval frame, said throat having a depth extending at least a third of the distance from the end of the handle to the closest part of the oval frame; a structural section extending across the throat between the two arms; a core integral to all structural members, said core of a metallic honeycomb material with cell openings in the honeycomb extending toward each face of the racket; a structurally reinforced resin encasing the honeycomb core; and the honeycomb core comprises at least two layers of honeycomb with a layer of structurally reinforced resin therebetween.

9. In an improved racket having an oval head, a handle and a throat between the handle and the oval head wherein the improvement comprises: a recess forming a U-shape to extend



around the exposed part of the outer periphery, a plurality of grommets to extend normal to the outer periphery and through the oval head, said grommets integral to at least one plastic strip seated in the recess, and the plastic strip has an S-shaped area between each grommet of a thin transverse member joined at opposite ends to alternate grommet sections.

4,042,239
GAME PLAYING STRUCTURE PARTICULARLY SOCCER GAME STRUCTURE
Claudio Cecchetti, Via Verdi, 54, Cernusco sul Naviglio (Milan), Italy
Filed July 19, 1976, Ser. No. 706,856
Claims priority, application Italy, July 21, 1975, 25607/75
Int. Cl.[2] A63F *7/10*
U.S. Cl. 273—85 F **19 Claims**

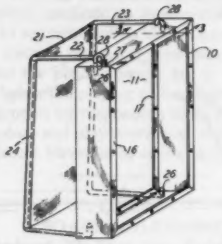


1. A game playing structure, particularly a soccer game, where the ball, or similar, disposed on the surface of a playing field at a given distance from a player figure, is thrown away by the movement of the player, a movement of the person taking part in the game being transferred to the player figure through mechanical means, characterized in that to the figure a throwing portion is connected, particularly in the form of a leg, in a swingable manner against a biasing spring, that the figure is movable across the surface of the playing field through the mechanical means, that an obstacle is arranged on the surface of the playing field in the path of motion of the throwing portion, which obstacle during the figure movement initially holds back the throwing portion and rotates the same against the biasing spring and then releases it as the figure moves further, and that in the figure direction of motion at the throwing portion area during the return stroke after its release caused by the spring action the ball or similar support is located.

4,042,240
ARCHERY TARGET

Gregory John Kinart, 7020 Packer Drive, Wausau, Wis. 54401

Filed Dec. 17, 1975, Ser. No. 641,546
Int. Cl.[2] F41J 3/00
U.S. Cl. 273—102 B 6 Claims

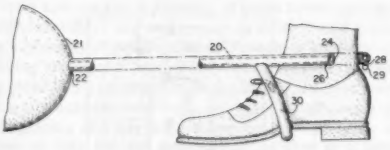


1. An archery target comprisinng a supporting member having an opening therein, two arrow-penetrating screens supported on said supporting member in spaced apart parallel planes and spanning said opening and consisting of woven strands of elastic material and having a mesh which permits penetration by an archery arrow and with said screens being adapted and arranged to hold the arrow at the position and angle of penetration of said screens, said strands being woven in a taut cross-strand pattern and with the strands being free of physical attachment to each other and thereby being free to slide on each other and move apart when contacted by the arrow and to elastically return to said pattern when the arrow is removed from said screens, and an archery arrow back stop material supported from said supporting member in a plane parallel to and aligned with said screens and being adapted to intercept the arrow penetrating said screens.

4,042,241
ELASTIC CORD-ATTACHED RETURNING SOCCER BALL

Copp Collins, 1225 Martha Custis Drive, Alexandria, Va. 22302

Continuation of Ser. No. 468,460, May 9, 1974, abandoned. This application July 28, 1975, Ser. No. 599,857
Int. Cl.[2] A63B 69/00, 69/26
U.S. Cl. 273—95 A 4 Claims



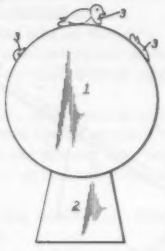
1. An inflated athletic ball resembling a ball used in the playing of soccer, provided with an elastic cord secured at one end thereto and extending therefrom and provided at its other end with at least one loop which receives a member of the human body such as the leg, calf, thigh, waist, neck or head, and whereby the ball, after being propelled, is enabled, upon rebound, to strike a part of the body of the user so as to drive the ball outwardly again to the elastic limit of the cord, said cord including an internal passage forming an airway extending into the ball and a normally closed valve at the opposite end of the cord which is opened while inflating the ball.

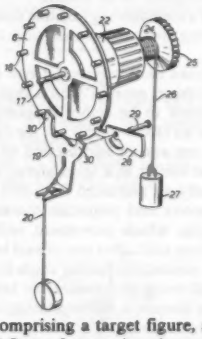
4. A practice device for soccer comprising an inflated athletic ball resembling a ball used in the playing of soccer, and an elongate elastic cord, which is secured at one end to said ball and which includes at least one loop at the other end thereof for receiving a portion of the body of a user, for enabling automatic return of the ball to the user after the ball has been propelled away from the user, said at least one loop comprising an adjustable loop having first and second free ends, and first and second annular elements attached to the loop adjacent said first free end of the loop for receiving the second free end of the loop whereby the second free end is inserted through the first and second annular elements, looped around the annular element furthest from the first free end and inserted back through the other annular elements, and means for fixing the second free end in place, a portion of said loop including a series of holes spaced along the length thereof and said fixing means comprising a pin which is adapted to be selectively fit into one of said series of holes.

4,042,242
RESILIENTLY MOUNTED TARGETS ROTATED BY ESCAPEMENT DEVICE

Bryan Frederick Nicholls, and Peter John Marshall, both of Northants, England, assignors to The Mettoy Company Limited, Northampton, England

Filed Oct. 14, 1975, Ser. No. 622,380
Int. Cl.[2] F41J 9/02
U.S. Cl. 273—105.2 4 Claims





1. A toy target comprising a target figure, a support structure supporting said figure for rotation about a horizontal axis remote from said figure, and drive means for rotating said figure about said axis at a controlled speed, said support structure comprising a wire element on which said figure is supported for pivotal movement between an upright position and a knocked down position, and return means for returning said figure automatically to said upright position after it has been moved into said knocked down position, said return means including a spring member comprising a first part rigidly connected to said figure to retain said figure on said wire element and a second part resiliently connected to said first part and arranged to produce a return force on said figure to pivot the figure to said upright position when said figure is knocked down, said drive means further comprising a gravitationally driven escapement mechanism in driving relationship with said figure, said escapement mechanism comprising an escapement

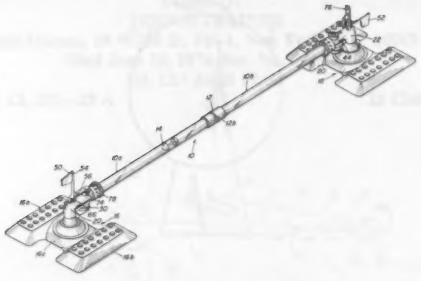
wheel mounted for rotation about said axis and having a plurality of circumferentially spaced projections, and a pawl lever pivotally mounted beneath said wheel for cooperation with said projections and having a pendulum rigidly suspended therefrom, a winding drum being mounted for rotation about said axis, and a flexible cord being wound upon said drum and suspending a driving weight, said drum being axially movable between a first position in which it is keyed for rotation with said wheel, whereby the escapement controls unwinding of said cord from said drum under the influence of said weight, and a second position in which said drum is free to rotate relative to said wheel for winding up said cord onto said drum.

4,042,243

PNEUMATIC SKILL GAME

Per O. Hoel, Plainsboro; Erkki Pekka Korpijaakko, Princeton, and Matthew A. Moustakas, Mercerville, all of N.J., assignors to CBS Inc., New York, N.Y.

Filed June 1, 1976, Ser. No. 691,414
Int. Cl.[2] A63B *71/04;* A63F *9/14*
U.S. Cl. 273—108 **7 Claims**



1. Game apparatus comprising, in combination:
a section of transparent, rigid tubing of uniform diameter throughout its length, and having an air vent therein at about the midpoint of its length,
a projectile of a diameter slightly less than the inner diameter of said tubing disposed within said tubing and movable therealong,
a pair of bellows units connected one to each end of said section of tubing, each of which includes a compressible bladder shaped to be stably supported on a supporting surface, and an elbow connector for carrying air from said bladder to one end of said section of tubing and for supporting said tubing at a level above said supporting surface, whereby air displaced from one end of said bellows units will move said projectile toward the other of said bellows units, which movement will be resisted by air displaced from said other one of said bellows units, each of said elbow connectors having vents therein and a one-way valve for allowing air to enter the bellows unit when the air pressure therein is below atmospheric pressure, and
a pair of indicator means operatively connected one to each of said elbow connectors for indicating entry of said projectile into the respective elbow connector.

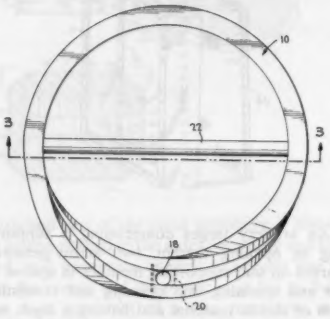
4,042,244

MOBIUS TOY

Thomas S. Kakovitch, 561 S. Hampton, Silver Spring, Md. 20903

Filed Apr. 27, 1976, Ser. No. 680,808
Int. Cl.[2] A63B *71/04;* A63F *7/00*
U.S. Cl. 273—109 **6 Claims**

1. A hand-held toy for challenging the manual dexterity and concentration of the user, said toy comprising:
an elongated band having grooves disposed in both sides thereof defining a raceway for a rolling ball-like playing piece said band being twisted about its longitudinal axis through an odd number of turns and having its ends permanently joined together to define a continuous Mobius ring;
an aperture disposed in said band communicating with the grooves to either side of said band and having a diameter sufficiently large to receive said ball-like playing piece therein;
door means positioned in said aperture to selectively open and close same;



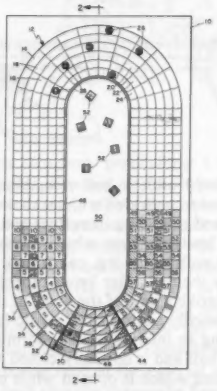
an arcuate arched cover disposed over the groove along a selected distance on one side of said band at the region of said door; and
handle means disposed on the Mobius ring coupled to said band for providing an area to be gripped by the user and from which the toy can be manipulated by hand to selectively allow the ball-like playing piece to roll in said grooves over an angular distance of up to 720° and through said door to opposite sides of said band.

4,042,245

GAME BOARD WITH CODED DICE AND GAME PIECES

Louis Yacoub Zarour, 3848 Boren St., San Diego, Calif. 92115

Filed Oct. 9, 1975, Ser. No. 621,010
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—134 CH **7 Claims**



1. Game apparatus for use with incrementally movable playing pieces, the game involving the advancement of the playing pieces in a field of play which comprises:
a game board defining a field of play for use with at least two playing pieces,

the field of play comprising a track having a plurality of uniquely identified lanes, one for each playing piece, each lane being divided into individual segments, alternating segments of each land being identified by a selected one of identical visual indicia and the other segments being identified by numerals, the numerical difference between successive numerals in a lane being two,

a playing piece being assigned to an individual lane and each playing piece confined to incremental movements from segment to segment within the assigned lane only,

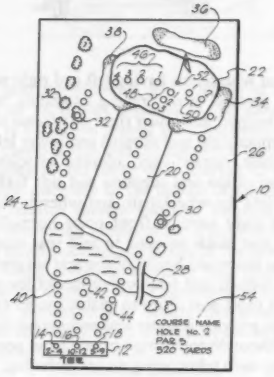
and game control means for determining the number of increments the playing pieces are to progress along the assigned lanes, the playing pieces being moved that number of segments corresponding to each signal of the game control means and play continuing until at least one of the playing pieces traverses its entire lane.

4,042,246

BOARD GOLF GAME

Larry W. Strandgard, 336 Elgin Ave., Forest Park, Ill. 60130

Filed Dec. 1, 1975, Ser. No. 636,755
Int. Cl.[2] A63F *3/00*
U.S. Cl. 273—134 CG **5 Claims**



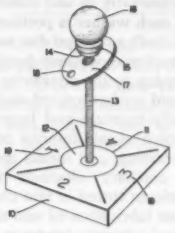
1. A golf game comprising a game board having a simulated golf course hole depicted thereon; the golf course including areas simulating a tee, fairway, green, water hazards, sand traps, trees and roughs; a plurality of paths to said green; each path simulated drive and and approach shots to said green and having a plurality of positions on said green; at least one of said paths being arranged to lead down said fairway and at least one of said paths being arranged to lead into and out of at least one of said water hazards, sand traps, trees and roughs; each of said paths beginning at a starting point at one of a plurality of tee positions on said tee and joining one another at a point of intersection on said green; each of said paths comprising a plurality of pre-marked and pre-determined positions representative of the position of a golf ball during play; chance means for operation by a player for randomly signifying travel of a respective token along one of said paths through randomly selectable indicia on said chance means; each of said tee positions having thereon a different plurality of indicia each of which may be chosen individually by operation of said chance means; a plurality of tokens where each token represents a golf ball for a respective player during a play; each of said tokens adapted to be moved manually to one of said path positions according to the indicia a player obtains on said chance means, said simulated golf course comprising an aerial photograph of a golf course having said tee positions imposed on said photograph in the area of the tee depicted on said photograph, said paths being imposed on said photograph in the area of the fairway, green, roughs, sand traps, trees and water hazards depicted on said photograph.

4,042,247

SPIN TOY

Robert W. Harrington, 1884 Oakridge Drive, Akron, Ohio 44313

Filed Feb. 25, 1976, Ser. No. 661,407
Int. Cl.[2] A63F *5/04*
U.S. Cl. 273—141 A **4 Claims**



1. A gravity operated spin toy comprising:

a. a base with a horizontal surface,

b. a vertical circular post on the base,

c. the post having a helical groove of such pitch that several turns occur in a vertical distance equal to the diameter of the post,

d. an annular spinner of thin non-magnetic but magnetically attractable material loosely surrounding the post,

e. the diameter of the spinner hole being such that it can engage the post in an inclined position at an angle of about 45°,

f. a non-magnetic ring smaller than the spinner, fixed on the post near its top,

g. a magnet on the post above the fixed ring and projecting beyond the ring sufficiently to attract the spinner in an inclined position, and with a magnetic strength sufficient to hold the spinner with a force permitting easy manual disengagement,

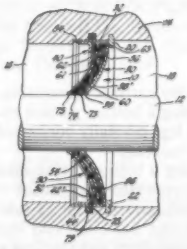
whereby a flick of a finger will separate the spinner from the magnet and start the spinner on a gyratory motion down the post.

4,042,248

HIGH PRESSURE SHAFT SEALS

Victor A. Williamitis, Kettering, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Sept. 16, 1976, Ser. No. 723,763
Int. Cl.[2] F16J *15/32*
U.S. Cl. 277—138 **4 Claims**



1. In an improved shaft seal for separating the high interior and low exterior pressures of a refrigerant compressor, the combination of a wall assembly comprising a wall having a circular bore, a shaft member passing through said bore so as to be aligned on the axis thereof, an axially stationary bore-engaging outer cup, means sealing said cup in said bore, a retainer ring fixedly telescoped within said outer cup, said outer cup

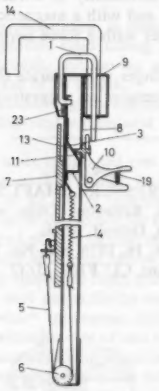
having a radial portion formed in an inward arcuate concave frustoconical section defining an opening which surrounds and closely approaches said shaft, the concavity of said outer cup section adapted to face the high interior pressure of said compressor, a plurality of substantially identical annular resilient plastic washers sandwiched between said outer cup and said retainer ring so that high interior pressure during operation of the compressor is operative to force said washers into layered conformity with the concavity of said outer cup section such that an inner edge of each washer is positioned in line-sealing engagement with said shaft, a resilient disc member on the high interior pressure side of said washers having integral radial spring fingers conforming to the concavity of said outer cup section and pressing said washer toward said outer cup section thereby to substantially maintain said layered conformity of said washers irrespective of said interior pressures when the compressor is not operating, and means including a bank of lubricant-containing capillary channels intermediate said washers whereby lubricant stored in said channels is available for substantially instant lubrication of said shaft upon start-up of said compressor, and whereby lubricant removed by high pressure-induced leakage past the inner edges of said washers may be replaced by lubricant moving from the capillary channels toward the shaft to insure continuous lubrication between said inner edges and said shaft during operation of the compressor.

4,042,249

OPENING SYSTEM FOR FOLDING BABY CARRIAGE

Kenzou Kassai, Osaka, Japan, assignor to Kassai Kabushikikaisha, Osaka, Japan

Filed Sept. 16, 1976, Ser. No. 724,063
Claims priority, application Japan, July 17, 1976, 51-85379
Int. Cl.² B62B *11/00*
U.S. Cl. 280—38 **2 Claims**



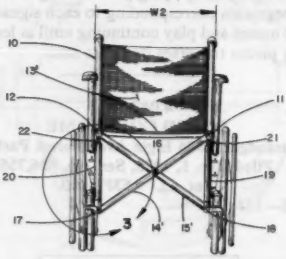
1. A folding baby carriage comprising, in combination:
a backrest having a bottom portion and a back;
front and rear legs pivotally connected to said bottom portion of said backrest;
a support having a bottom, being made of tubing material, and slidably provided at said back of said backrest;
connecting rods, said bottom of said support being connected with said front and rear legs by said connecting rods so that said front and rear legs are opened and folded in accompaniment with sliding of said support;
a stopper integrally provided at said back of said backrest engageable in apertures provided in said support to maintain alternatively an opened and folded state; and
a U-shaped operating rod having a first end and a second end slidably provided at a handle attachment extending to said stopper at said first end and being provided with a slider having an inclined upper portion in contact with a projection of said stopper at said second end, and said slider being connected through a spring with a flexible connecting means extending over a guide wheel provided at said bottom of said support, to said bottom of said backrest.

4,042,250

WIDE SEAT WHEELCHAIR

Keith S. Rodaway, Santa Monica, Calif., assignor to Everest & Jennings, Inc., Los Angeles, Calif.

Filed July 26, 1976, Ser. No. 708,711
Int. Cl.² B62B *11/00*
U.S. Cl. 280—42 **2 Claims**



1. A wide seat wheelchair having left and right seat supports and centrally pivoted cross bracing extending between the upper left seat support and lower right side frame of the wheelchair and the upper right seat support and lower left side frame of the wheelchair, respectively, adapted to scissor together upon movement of the seat supports and side frames towards each other to fold the wheelchair, and wherein there are provided left and right vertical front posts normally receiving vertical front post slides secured to said seat supports to accommodate the increased height of the seat supports when the wheelchair is folded, and telescoping means for each of said front posts and front post slides to enable longer cross bracing to be utilized to provide a wider seat and permit folding of the wheelchair without disconnection of said front post slides with said front posts, each telescoping means including, in combination:
a. a vertical intermediate tube having its lower end telescopically received in a front post and its upper end telescopically receiving the associated front post slide;
b. a first cross-pin in the upper interior portion of said front post slide;
c. a second cross-pin in the lower interior portion of said intermediate tube;
d. a third cross-pin in the lower portion of said front post;
e. interconnecting means interior of said front post slide and intermediate tube connected between said first and second cross-pins for limiting the telescoping action of said front post slide and intermediate tube to a distance preventing separation of the same; and
f. lost motion coupling means interior of said front post and intermediate tube between said second cross-pin and said third cross-pin, for limiting the telescoping extent of said intermediate tube and front post to a distance preventing separation of the same.

4,042,251

SAFETY DEVICE FOR LAWN MOWERS

Clifford S. Rutan, 24 Lake Road, Morristown, N.J. 07960

Filed July 19, 1976, Ser. No. 706,181
Int. Cl.² B62B *11/00*
U.S. Cl. 280—47.33 **5 Claims**

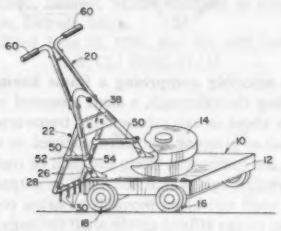
1. A safety device for attachment to a lawn mower comprising in combination:
an elongated frame assembly including at least two laterally

spaced leg elements connected across one end of each of said leg elements;

at least one ground anchoring element depending from said frame assembly at the end thereof where said leg elements are connected;

and clamping means extending transversely across the free ends of said leg elements, said clamping means including first and second clamp plates, said first clamp plate being integral with said frame assembly and said second clamp plate being separate from and cooperable with said first clamp plate to clamp the handle of a lawn mower therebetween;

a pair of elongated reinforcement members being provided each of which is rotatably secured at one end thereof to



one of said leg elements and adapted at the other end thereof to be fixedly secured to the handle of a lawn mower at a location spaced from the point of securement of said clamp plates and the handle of the mower;

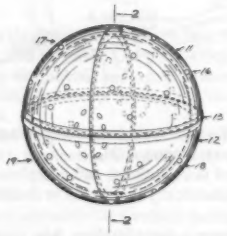
said clamping means being thus adapted to fixedly secure said frame assembly to the handle of the lawn mower in angular relation thereto and at a location such that the ground anchoring elements are out of contact with the ground during normal operation of the lawn mower, the mower being pivotable about its rear wheels to thereby shift said leg elements into a substantially vertical orientation and simultaneously secure the ground anchoring elements into the ground to support the lawn mower in a stable nonrollable position.

4,042,252

INFLATABLE SPHERICAL VEHICULAR DEVICE

Richard D. Winter, 10237 Park Ave., Bellflower, Calif. 90706

Filed Aug. 13, 1975, Ser. No. 604,435
Int. Cl.[2] B60F *3/00*
U.S. Cl. 280—206 **2 Claims**



1. A spherical device comprising:

a pair of hemispherical sections and each of said sections comprising:

an outer flexible skin;

an inner flexible skin;

a flat annular member bonded to the periphery of both said outer skin and said inner skin;

said outer skin having a plurality of apertures;

said inner skin having a plurality of apertures, each of which is radially aligned with respective ones of said apertures in said outer skin;

a plurality of flexible tubes, each of which is respectively bonded to one aperture of said outer skin and to the radially aligned aperture of said inner skin;

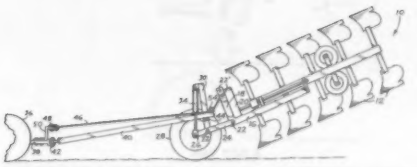
a zipper means releasably fastening said hemispherical sections together so that a person may have access to the interior.

4,042,253

WEIGHT TRANSFER SYSTEM FOR COUPLING A GANG PLOW TO A TOWING VEHICLE

Glen A. Watts, P.O. Box 462, Jerome, Idaho 83338

Filed Sept. 2, 1976, Ser. No. 719,964
Int. Cl.[2] B62D *53/00*
U.S. Cl. 280—405 B **6 Claims**



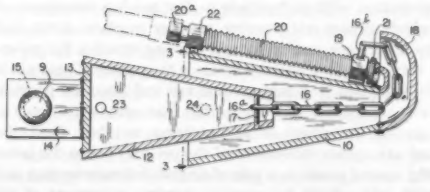
1. In a coupling assembly for interconnecting a ground-working implement and a towing vehicle, wherein the coupling assembly includes a frame, a pair of laterally spaced transport wheels therefor, a pair of lifting levers connected pivotally to the frame and arranged for connection to laterally spaced positions on the implement for raising and lowering the implement, a towing tongue attached at its rearward end to the frame and arranged at its forward end for connection to a towing vehicle, and extensible power means operatively interconnecting each lever and the frame for pivoting the lever, the combination therewith of a weight transfer system comprising an elongated flexible connector having one end arranged for operative connection to a ground-working implement vertically above the connection of the levers to the implement and having its opposite end arranged for connection to a towing vehicle, the connector being proportioned to be tensioned as the levers lift the implement from the ground, whereby the weight of the implement creates a downward force at the point of connection of the connector to the towing vehicle, to counteract the upward force created by the weight of the implement to the point of connection of the tongue to the towing vehicle.

4,042,254

AUTOMOBILE HITCH COUPLER AID

Gordon L. Allen, 12994 Cherry Lane, Chesterland, Ohio 44026

Filed Apr. 29, 1976, Ser. No. 681,578
Int. Cl.[2] B60D *1/14*
U.S. Cl. 280—478 B **2 Claims**



1. An automobile hitch coupler aid comprising a female hollow pyramidal member, means for mounting said member on a vehicle, a male pyramidal member having an outer surface substantially complementary to the inner surface of said female

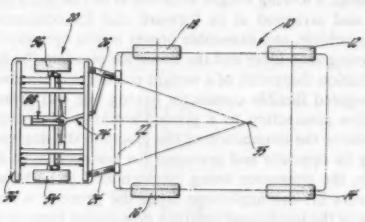
pyramidal member, an elongated flexible member having one end fixed to the narrower end of said male pyramidal member and passing outwardly through the narrower end of said female pyramidal member, and means comprising a nut attached to said other end of said flexible member and a linear screw on which said nut is threaded, said screw mounted on said outer wall of said female pyramidal member for rotation about the axis of said screw carried on the outer wall of said female pyramidal member connected with the other end of said flexible member for winding up and paying out said flexible member, and said attachment between said nut and said flexible member preventing any substantial rotation of said nut, the parts being so proportioned as to permit movement of said pyramidal members between a closely nested position and a separated position permitting movement of said male pyramidal member relative to said female pyramidal member in any direction.

4,042,255

STEERABLE TRAILER FOR A SMALL VEHICLE

David F. Drewek, Sterling Heights, and Dickie D. Hoffman, Utica, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Nov. 15, 1976, Ser. No. 741,804
Int. Cl.² B62D *13/06*
U.S. Cl. 280—445 **4 Claims**



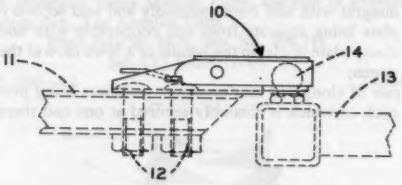
1. A trailer adapted to be closely coupled to the rear end of a vehicle having a transmission provided with a manually operable lever for selectively conditioning said transmission for forward and reverse drives, said trailer comprising a frame, a transverse axle mounted to said frame and having a pair of wheels supported by the opposite ends thereof for steering movement, a mechanism for causing steering movement of said wheels when said vehicle is driven rearwardly in a turn and for maintaining said wheels in a straight-ahead position when the vehicle is driven forwardly, said mechanism including a steering member supported by said frame for pivotal movement about a vertical axis and having an arm extending forwardly for connection with said vehicle so that turning movement of the vehicle causes said steering member to pivot about said vertical axis, a pin carried by said steering member for movement between a first position wherein the center of said pin is coaxially aligned with said vertical axis and a second position wherein the center of said pin is offset from said vertical axis so that pivotal movement of said steering member about the vertical axis causes movement of the pin only when the latter is in the second position, a pair of tie rods interconnecting said pin with said wheels for causing steering movement of the wheels when said pin is in said second position and said steering member is pivoted about said vertical axis, and an actuator carried by the trailer for moving said pin to said second position when the transmission is conditioned for reverse drive.

4,042,256

HITCH ASSEMBLY

David Lepp, 4817 E. Turner, Fresno, Calif. 93727

Filed May 7, 1976, Ser. No. 684,285
Int. Cl.² B60D *1/06*
U.S. Cl. 280—512 **6 Claims**



1. A hitch assembly comprising a frame having a path of travel extending therethrough, a shaft mounted on the frame for movement about an axis substantially transverse to the path of travel, a pair of grasping members received on said frame in juxtaposition for movement along the path of travel and having cam ways through which the shaft is extended, a lever borne by the shaft and being movable to cause rotation of the shaft, and cam means affixed on the shaft for engagement with the cam ways of the grasping members to cause movement of the grasping members along said path of travel between extended opened positions and retracted closed positions upon movement of the lever.

4,042,257

SKI BINDING

Georges Pierre Joseph Salomon, Annecy, France, assignor to Etablissements Francois Salomon et Fils, Annecy, France

Continuation-in-part of Ser. No. 607,615, Aug. 25, 1975, Pat. No. 3,988,841, said Ser. No. 611,419. This application May 24, 1976, Ser. No. 689,200
Claims priority, application France, May 22, 1975, 75.15967
Int. Cl.² A63C *9/08*
U.S. Cl. 280—624 **15 Claims**

1. A safety binding for a ski boot comprising:
a baseplate mounted upon a ski,
two arms hinged in relation to said baseplate,
arranged symmetrically in relation to the longitudinal axis of said ski;
each comprising a boot-holding jaw co-operating with lateral edges of said boot,
a resilient element mounted upon said baseplate actuating said hinged arms, causing them to bear against said lateral edges of said boot;
each of the jaws comprising:
at one end a first ramp
substantially parallel with the plane of said ski,
at an angle to the longitudinal axis of said ski,
at the other end a second ramp
located substantially in a vertical plane,

each of said lateral edges of said boot comprising:

a first ramp

at an angle to the plane of support of the sole of the boot upon said baseplate,

a second ramp

substantially perpendicular to the plane of support of the sole of the boot upon said baseplate,

said first ramps of the jaw and the boot co-operating with each other under the action of said resilient element in such a manner as to apply the second ramp of the boot against the second ramp of the jaw.

4,042,258

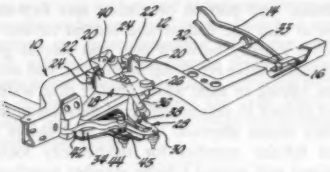
TORSION BAR MOUNTING ARRANGEMENT

Casimer J. Cislo, Detroit, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed June 25, 1976, Ser. No. 699,794

Int. Cl.[2] B60G *11/18*

U.S. Cl. 280—664 **5 Claims**



1. For use with an automotive front suspension system, a torsion bar mounting arrangement comprising a lower control arm having a central trunk portion and a pair of spaced-apart leg members extending from one end of said central trunk portion, an open-ended trough formed in said central trunk portion, a preloaded torsion bar mounted so as to have one end thereof positioned opposite said open-ended trough, and a load-reaction member secured at one end thereof to said one end of said torsion bar substantially normal to the axis thereof and extending therefrom into said open-ended trough so as to be maintained in engagement therewith by said preloaded torsion bar, said open-ended trough being wider than said load-reaction member for permitting some fore-and-aft movement of said trough relative to said load-reaction member in response to load inputs into said suspension system, thereby improving ride characteristics and minimizing bending of said torsion bar.

4,042,259

SUSPENSION STRUT ASSEMBLIES FOR MOTOR VEHICLE SUSPENSIONS

Kurt H. Fiedler, Geinsheim, and Adolf Draisbach, Kelsterbach, both of Germany, assignors to General Motors Corporation, Detroit, Mich.

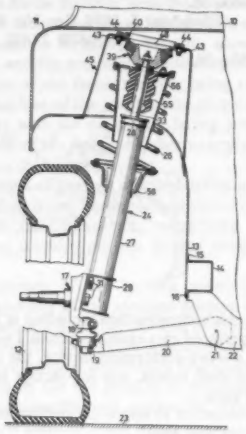
Filed July 17, 1975, Ser. No. 596,715

Claims priority, application Germany, July 25, 1974, 2435723

Int. Cl.[2] B60G *11/50*

U.S. Cl. 280—701 **7 Claims**

1. A suspension assembly for a vehicle having a body with an aperture therein, said assembly comprising: a telescopic damper including a protective tube, a damper tube removably mounted within said protective tube, and a piston rod telescopically received in said damper tube; a wheel mounting means connected to said protective tube; an intermediate member connected to said piston rod, said member being releasably mounted to said body at the periphery of said aperture; a spring surrounding said protective tube; a lower spring seat mounted on said protective tube; and an upper spring thrust plate abutting said intermediate member; the relative size of said aperture and said intermediate member, being such that upon release of said intermediate member, at least said intermediate member, said piston rod and said damper tube can be removed upwardly



through said aperture without removing said thrust plate, spring, seat and protective tube.

4,042,260

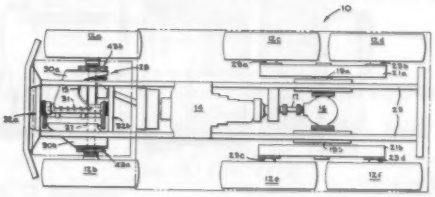
VEHICLE WHEEL SUSPENSION WITH ROLL FREEDOM

Donald W. Youmans, San Clara, Calif., assignor to FMC Corporation, San Jose, Calif.

Filed May 4, 1976, Ser. No. 683,133

Int. Cl.[2] B60G *11/18*

U.S. Cl. 280—721 **9 Claims**



1. A suspension system for use with a motor vehicle having a frame and a plurality of supporting wheels, said suspension system comprising:

a torsion bar extending longitudinally of said vehicle at one end thereof and generally along the centerline thereof;

a pair of control arms with each arm extending transversely of said vehicle from one side of said torsion bar;

means for rigidly connecting the inner end of one of said control arms to one end of said torsion bar;

means for rigidly connecting the inner end of the other of said control arms to the other end of said torsion bar;

mounting means for connecting said torsion bar to said frame of said vehicle so that said frame may rotate about the axis of said bar; and

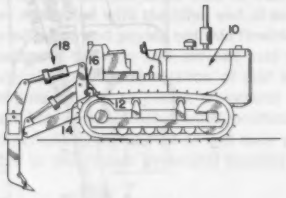
means for rotationally mounting a corresponding one of a pair of said wheels to the outer end of each of said control arms.

4,042,261

MOUNTING FOR SECURING TOOLS TO VEHICLES

John H. Babbitt, Jr., Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed May 5, 1976, Ser. No. 683,567
Int. Cl.[2] B60R 27/00
U.S. Cl. 280—762 12 Claims



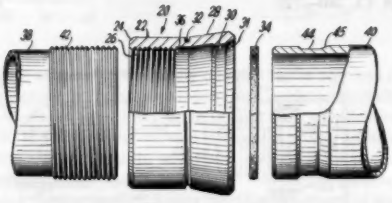
1. In a vehicle construction including at least two, nominally aligned, apertured ears extending from a side of the vehicle for mounting a work-performing device, the combination of:
   a pair of shaft means, one for receipt in each of said apertured ears;
   a base connected to said work-performing device disposable adjacent said ears;
   a pair of wedge means carried by said base and interposed between said base and a side of a respective one of said shaft means; and
   means for effecting movement of said wedge means on said base to tightly frictionally wedge said wedge between said base and said shaft means.

4,042,262

SWIVEL COUPLING MEANS FOR ELECTRICAL CONDUITS AND THE LIKE

Thomas C. Mooney, Mount Sinai, and Padej Gajajiva, Elmhurst, both of N.Y., assignors to I-T-E Imperial Corporation EFCOR Division, East Farmingdale, N.Y.

Filed Mar. 23, 1976, Ser. No. 669,444
Int. Cl.[2] F16L 17/06
U.S. Cl. 285—98 8 Claims



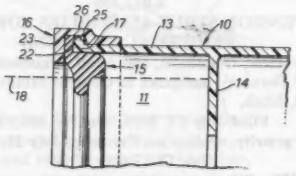
1. An assembly adapted to be joined to a first elongated tubular member having external threads provided on one end thereof, said assembly comprising:
   a. a second elongated tubular member, said second tubular member having an annular groove provided on an outside surface thereof proximate one end thereof;
   b. an elongated hollow tubular sleeve;
   c. axially extending, internal threads provided within one end of said sleeve for engaging the externally threaded end of the first tubular member;
   d. a section integral with said sleeve at an opposite end thereof spaced from said internal threads;
   e. connecting means for engaging said annular groove provided on said section of said second tubular member to permit relative rotational movement between said sleeve and said second tubular member, whereby relative rotational movement is permitted between said first and second tubular members; said connecting means further permitting axial movement of said sleeve relative to said second tubular member along width of said annular groove;
   f. said connecting means including a lip extending radially inward from said section of said sleeve, said lip being disposed in said annular groove of said second tubular member, said lip having an axial width smaller than said width of said annular groove to permit said axial movement, said lip extending completely around an inside surface of said section of said sleeve;
   g. said section of said sleeve including means for permitting said section to be deformed from an initially flared outward condition into engagement with said groove, said section being maintained in a deformed condition absent an application of a further deforming force in an opposite direction so that said lip is prevented from leaving said groove after assembly;
   h. a second annular groove provided on an inside surface of said sleeve proximate an axially inner end of said internal threads, said section of said sleeve extending from proximate an axially inner end of said second groove adjacent to said internal threads;
   i. an annular end portion proximate said first-mentioned groove at said one end of said second tubular member extending radially outward into said second groove to permit said relative rotational movement, said annular end portion having an axial width smaller than width of said second groove to permit said axial movement; and
   j. interface means disposed between said sleeve and said second tubular member for temporarily locking said sleeve and said second tubular member together when a surface of said lip is disposed adjacent to a wall of said annular groove of said second tubular member so that said sleeve does not rotate while said first tubular member is being engaged therewith, whereby after engagement of said sleeve and said first tubular member has been completed, said sleeve is axially moved relative to said second tubular member so that said surface of said lip is spaced from said wall of said annular groove of said second tubular member to thereby permit the relative rotational movement between said first and said second tubular members.

4,042,263

PIPE COUPLINGS

Geoffrey Harrison, Brymar, Manley Road, Ilkley, West Yorkshire, England

Filed June 20, 1975, Ser. No. 588,872
Int. Cl.[2] F16L 17/00
U.S. Cl. 285—110 5 Claims



1. A flexible-joint pipe coupling comprising:
   a. a cylindrical coupling sleeve having at least one annular abutment member positioned within said sleeve to define a pipe receiving socket and at least one rib circumferentially positioned and having a bevel at the end of the sleeve;
   b. an annular locking ring having an inner diameter less than the inner diameter of said sleeve and including a planar radial abutment surface axially spaced apart from said rib level, and an axially extending portion having at least one first and second inner surface, said radial abutment surface extending from the inner diameter of said ring to said first

surface, said first surface having an inner diameter substantially the same as the outer diameter of said rib and extending from the radial abutment surface to the edge of the rib away from the sleeve end and said second surface having an inner diameter substantially the same as the outer surface of said sleeve and an interface between said first and second surface in locking contact with at least a portion of the edge of the rib away from the sleeve end; and

c. an annular resilient seal comprising a radial outer portion having a shape substantially the same as and positioned within the annular space defined by said bevel, first inner surface and radial abutment surface; a deflectable radial inner portion which has an outer diameter substantially the same as the inner diameter of the socket and an inner diameter which is less than the inner diameter of the locking ring, said inner portion having along said outer diameter of said deflectable radial inner portion a first axially extending cylindrical sealing surface engaging the inner surface of the socket adjacent the end of the sleeve and a deflectable second sealing surface adapted for engagement with the outer surface of a pipe positioned in the pipe receiving socket; and an intermediate portion having a smaller radial and axial extent than said inner or outer portions and interconnecting said outer and inner portions, said intermediate portion being in substantial axial compression between the radial abutment surface and the end of the sleeve whereby the axial loading from the locking ring is transmitted through the intermediary of the intermediate portion.

4,042,264

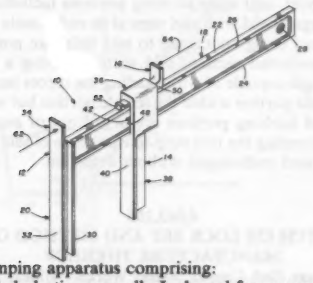
CLAMPING APPARATUS

James E. Shumer, 332 W. Broadway, Maumee, Ohio 43537

Continuation of Ser. No. 648,116, abandoned. This application Nov. 29, 1976, Ser. No. 745,859

Int. Cl. B25b *1/02*

U.S. Cl. 269—88 **10 Claims**



1. Clamping apparatus comprising:

a molded plastic, generally L-shaped frame member including an elongate bar portion and a jaw portion formed integrally with the bar portion and extending substantially perpendicularly with respect thereto;

the jaw portion of the frame member being substantially H-shaped in cross section at least adjacent its distal end to provide opposed inwardly facing and outwardly facing jaw surfaces;

said inwardly and outwardly facing jaw surfaces extending substantially parallel to each other and substantially perpendicularly to the bar portion of the frame member;

a molded plastic slider member including an aperture portion defining an axis and a jaw portion formed integrally with the aperture portion and depending therefrom substantially perpendicularly to the axis;

the jaw portion of the slider member being substantially T-shaped in cross section throughout its length to define a jaw surface;

said jaw surface of the slider member extending substantially parallel to the inwardly and outwardly facing jaw surfaces of the jaw portion of the free member;

the slider member being normally positioned on the bar portion of the frame member with the jaw surface of the slider member facing the inwardly facing jaw surface of the frame member to apply inwardly directed forces therebetween and the positioning of the slider member on the bar portion of the frame member being reversible so that the jaw surface of the jaw portion of the slider member cooperates with the outwardly facing jaw surface of the jaw portion of the frame member to apply outwardly directed forces therebetween;

the aperture portion of the jaw member defining an inclined camming surface on an inside surface thereof;

a molded plastic locking member comprising a camming portion and an actuator portion formed integrally therewith;

the camming portion of the locking member extending through the aperture of the aperture portion of the slider member and engaging the bar portion of the frame member along substantially the entire length of said bar portion when said slider member is normally positioned or reversibly positioned on the bar portion of the frame member, such that the inwardly and outwardly directed forces between the jaw surface of said frame member and the jaw surface of said slider member are selectively positioned along substantially the entire length of said bar portion;

the camming portion of the locking member defining an outwardly facing camming surface for cooperation with the inwardly facing camming surface of the aperture portion of the slider member to lock the slider member against movement along the bar portion of the frame member and extending to an outwardly projecting tip for preventing disengagement of the locking member from the aperture of the slider member; and

the actuator portion of the locking member extending substantially perpendicularly to the camming portion thereof to first advance the slider member along the bar portion of the frame member and then lock the slider member either in engagement with an object situated between the jaw surface of the jaw portion of the slider member and the inwardly facing jaw surface of the frame member, or in separating objects by the outwardly directed forces of the jaw surface of the jaw portion of the slider member cooperating with the outwardly facing surface of the jaw portion of the frame member.

4,042,265

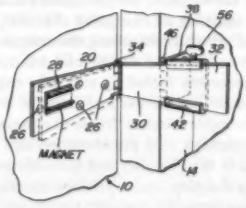
WEDGE-TYPE LIMIT STOP FOR OUTWARD OPENING DOOR

Jimmie A. Chezem, Rte. 9, Box 164A, Sparta, Tenn. 38583

Filed Oct. 27, 1976, Ser. No. 736,195

Int. Cl.[2] E05C *17/06*

U.S. Cl. 292—262 **8 Claims**



1. In combination, a door jamb defining an opening, a door horizontally swingably supported from said jamb for movement between open and closed positions, said jamb and door including corresponding inner and outer sides, an elongated wedge member pivotally supported at its minor dimension end

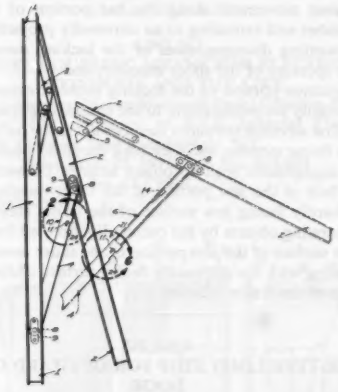
on the free swinging edge of said door for swinging between first and second active and inactive positions with said wedge projecting outwardly of said inner side of said door and swung toward the hinged edge of said door overlying the inner side thereof, respectively, an elongated, tapered and open-sided channel member having its minor dimension end pivotally supported from said jamb for swinging between first and second active and inactive positions with said channel member projecting outwardly of the inner side of said jamb and swung away from said door overlying the inner side of said jamb, respectively, said wedge and channel member paralleling and being registered with each other when said door is in said closed position and said wedge and channel member are in their active positions with said wedge being swingable into said channel member through the open side thereof, said wedge being seatingly engageable in said channel member upon movement of said door toward an open position and longitudinal shifting of said wedge toward the minor dimension end of said channel member.

4,042,266

EXTENSIBLE SAFETY LATCH MEANS FOR PIVOTABLE WINDOWS

Axel W. Anderberg, Los Angeles, and George A. Taylor, LaCrescenta, both of Calif., assignors to A. W. Anderberg Manufacturing Co., Los Angeles, Calif.

Filed July 16, 1976, Ser. No. 705,802
Int. Cl.² E05C *17/06*
U.S. Cl. 292—267 **3 Claims**



1. The combination with a window having a fixed window frame, a pivoted window frame, and hinge means joining the frames, of an extensible safety latch means, comprising:

a. a pair of telescopable bar members including confronting portions defining an elongated chamber;

b. means of pivotally attaching the remote ends of the bars members to the fixed and pivotal window frames;

c. a latch assembly including mutually engagable latch elements carried by the bar members for limiting movement of the pivotable window frame to a preselected position, a stop projecteing into the chamber, and a lever pivotally mounted in the chamber and movable between a position engaging the stop, and a position clearing the stop;

d. and a key member engagable with one of the latch elements to separate the latch elements thereby to permit further movement of the pivotal window;

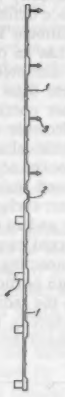
e. one of the members having a key opening providing access to the lever, and dimensioned to receive the key member for effecting disengagement of the lever from the top.

4,042,267

SEALS

Colin W. F. Clinch; Peter A. R. James, both of Woodley, and John H. Tibbett, Stansted, all of England, assignors to ITW Limited, Slough, England

Filed Nov. 24, 1975, Ser. No. 634,963
Claims priority, application United Kingdom, Nov. 29, 1974, 51700/74; Aug. 30, 1975, 35842/75
Int. Cl.² B65D *27/30*
U.S. Cl. 292—318 **11 Claims**



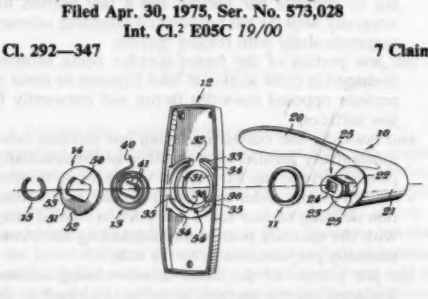
1. A tamper-proof security seal for sealing the open end of garment bags in transit, said seal having two strip-like portions and a plurality of pairs of complimentary male and female latching portions, said latching portions being formed at positions spaced along the lengths of said strip-like portions and extending perpendicularly to said strip-like portions, said latching portions being adapted so that when said strip-like portions are brought together in juxtaposed relation that at least one of said pairs of said latching portions engages to form a non-return restraint, said male latching portions including a stem and an enlarged head with said stem at its end remote from said enlarged head being connected to said strip-like portion by a frangible weakened section, said section having a predetermined strength capable of withstanding the forces necessary to latch the male portion within the female portion but which will break if said latching portions are urged out of engagement, thereby preventing the two strip-like portions of said seal from being separated undamaged without detection.

4,042,268

LATCH OR LOCK SET AND METHOD OF MANUFACTURE THEREOF

George Albert Carl Coglan, Astral Works, Wilden, Stourport-on-Severn, Worcestershire, DY13 9LH, England

Filed Apr. 30, 1975, Ser. No. 573,028
Int. Cl.² E05C *19/00*
U.S. Cl. 292—347 **7 Claims**



1. A latch or lock set which comprises, in combination:

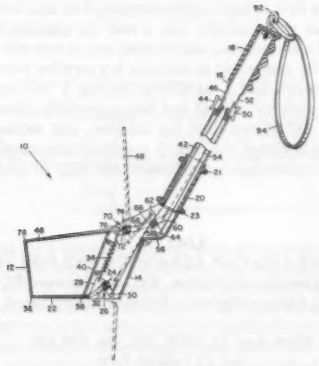
a. a back plate and a lever or handle which has an integral barrel projecting laterally from one end thereof, the back plate being apertured to permit the extension therethrough of said barrel;
b. a spring means having one end portion snugly encircling and connected to said barrel and the other end portion engaging a fixed anchorage on said back plate;
c. a right cylindrical recess formed in said barrel from the free end thereof and an insert in said recess, the insert being hollow and of square section and having tongues projecting laterally therefrom into slots formed in the free end of the barrel;
d. a locking washer mounted on said barrel and having lugs which also project into said slots and overlie said tongues, said locking washer additionally having internal tab portions in resilient engagement with said barrel so as substantially to prevent any movement of said locking washer relative to said barrel after the lugs on the washer have been correctly positioned in relation to said tongues;
e. a stop element on the back plate in the plane of said washer; and
f. said locking washer also incorporating angularly spaced opposed abutments which coact one at a time with said stop element to limit the extent of angular movement of said lever about the axis of rotation of said barrel either against or under the influence of said spring means.

4,042,269

SANITARY DEVICE FOR REMOVING ANIMAL DROPPINGS

Geraldine J. Skermetta, San Antonio, Tex., assignor to Skermetta, Inc., San Antonio, Tex.

Filed June 16, 1976, Ser. No. 696,482
Int. Cl.[2] A01K *29/00*
U.S. Cl. 294—19 R **5 Claims**



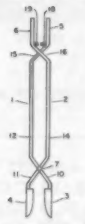
1. A sanitary device for removing animal droppings comprising:
base structure;
handle means attached to and extending upwardly from said base structure;
container means attached to and extending generally horizontal from said base structure, said container means having a hinged top and hinged bottom pivotally mounted inside said base structure;
opening means in said handle means operatively connected to said hinged top and hinged bottom, said opening means causing said hinged top to pivot open to receive animal droppings in said container means and said hinged bottom to pivot open to remove animal droppings from said container means, said opening means also being adapted for operation by a single hand for simultaneous opening of said hinged top and said hinged bottom to facilitate cleaning;
biasing means connected to said hinged top and said hinged bottom to urge said hinged top and said hinged bottom toward a closed position.

4,042,270

POST HOLE DIGGER

Edward E. Weiland, 8768 Buffalo, Union Lake, Mich. 48085

Filed Apr. 15, 1976, Ser. No. 677,250
Int. Cl.[2] A01B *1/16*
U.S. Cl. 294—50.8 **4 Claims**



1. A post hole digger adapted for digging deep holes comprising a pair of arm members each having a spade end, a central segment and a handle end, each of said arm members having spade means connected at said spade end, said spade end and said handle end of each of said arm members being on substantially the same longitudinal axis, each of said central segments being offset from the axis through its respective spade end and handle end, each of said central segments being connected to its respective spade end by a lower angle segment and to its respective handle end by an upper angle segment, said arm members being pivotably connected at a location in said lower angle segments, said pivotable connection being of the scissor type such that said central segments of said arm members are on the opposite side of the central longitudinal axis of said digger from their respective spade ends, said central segments being alligned such that when said handle ends are pivoted to their closest approach the upper ends of said central segments are spaced from each other at least about as far apart as their lower ends, said upper angle members crossing each other such that said spade end and said handle end of each of said arm members are on the same side of said central longitudinal axis.

4,042,271

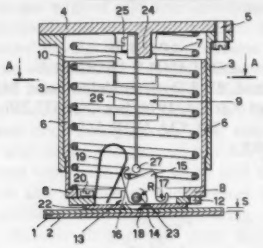
DEVICE FOR AUTOMATICALLY GRASPING PIECES OF FABRIC

Costantino Vinciguerra, Florence, Italy, assignor to Nuovo Pignone, S.p.A., Florence, Italy

Filed Mar. 19, 1976, Ser. No. 668,806
Claims priority, application Italy, Mar. 20, 1975, 21454/75
Int. Cl.[2] B65H *3/22*
U.S. Cl. 294—61 **5 Claims**

1. A device for automatically grasping pieces of fabric comprising:
a movable body including a head with a slit therein,
an oscillating member having substantially the shape of a triangle with at least one point mounted near the lower vertex of said oscillating member, side grooves at the ends of the upper base side of said member, said member being pivotally mounted on said lower vertex to said head in the middle zone of said slit,
a resilient element shaped substantially in the form of an inverted U supported by said head of said movable body, which constantly bears on said oscillating member,

said point depending from said oscillating member and extending through said slit when said member is oscillated in



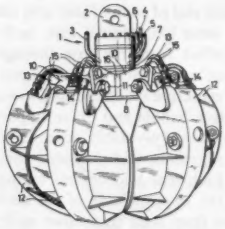
a predetermined manner for automatically grasping a piece of fabric.

4,042,272

HYDRAULIC GRAB

Heinrich Götzen, Bolberg 79, D 5802 Wetter 1, Germany

Filed June 13, 1975, Ser. No. 586,659
Claims priority, application Germany, June 14, 1974, 2428566
Int. Cl.² B66C *13/14*
U.S. Cl. 294—88 **12 Claims**



1. An hydraulic octopus grab comprising a rotary head, means fixed to the top of said rotary head for suspending said grab, a vertical shaft rotatably mounted within said rotary head, pressure chambers formed within said rotary head and adapted to be supplied with hydraulic pressure through connectors in a housing wall of said rotary head, each chamber being at least partly defined by relatively movable parts fixed to said housing wall and said shaft respectively whereby said shaft may be rotated in said housing in one direction or the other by application of hydraulic pressure to appropriate ones of said chambers, a distributor head carried at the lower end of said shaft and rotatable therewith, grab blades and corresponding hydraulic operating cylinders pivotally mounted on said distributor head, and said distributor head incorporating ducts for supplying hydraulic fluid to said cylinders and leading to external connectors for connecting said ducts with hydraulic fluid flow and return lines.

4,042,273

RAIL WHEEL

Wilhelm Heller, Rheinhausen, and Walter Knorr, Bochum, both of Germany, assignors to Fried. Krupp Huttenwerke AG, Bochum, Germany

Filed May 20, 1975, Ser. No. 579,188
Int. Cl.² B60B *17/00*
U.S. Cl. 295—30 **15 Claims**

1. A rail wheel comprising a wheel rim, wheel disc, and wheel hub wherein at least the wheel rim consists essentially of a steel whose composition consists essentially of:

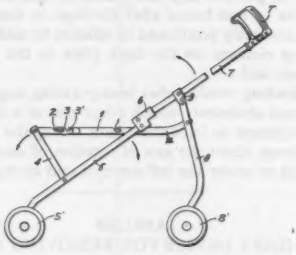
0.07 to 0.12 weight percent carbon
0.20 to 0.50 weight percent silicon
4.0 to 5.0 weight percent manganese
0.04 to 0.12 weight percent niobium
0.007 to 0.012 weight percent nitrogen
0.005 to 0.025 weight percent metallic aluminum,
the balance being iron with the usual impurities.

4,042,274

COLLAPSIBLE FRAME FOR CARRIAGES

Ramon Jane Cabagnero, 49-53 Nena Casas, Barcelona, Spain

Filed Jan. 26, 1976, Ser. No. 652,148
Claims priority, application Spain, June 3, 1975, 213229
Int. Cl.² B62D *23/00*; B62B *7/00*
U.S. Cl. 296—1 B **3 Claims**



1. An improved collapsible frame for carriages with said frame having an open condition and a folded condition and comprising a front leg member having a first end and a second end, a tie bar having a first end pivotally connected to said front leg member intermediate the ends thereof and a second end, a side member for supporting a basket-bassinet or the like and having a first end pivotally connected to said second end of said tie bar and a second end, a rear leg member having a first end and a second end, said second end of said side member being pivotally connected to said rear leg member intermediate the ends thereof, and a handlebar having a first end and a second end with the second end being pivotally connected to said second end of said front leg member, said second end of said rear leg member also being pivotally connected to said handlebar at a position intermediate said ends of said handlebar.

4,042,275

STAKE POST AND CAP ARRANGEMENT FOR TRAILER

John J. Glassmeyer, Covington, Ky., and Howard W. Hughes, Cincinnati, Ohio, assignors to Pullman Incorporated, Chicago, Ill.

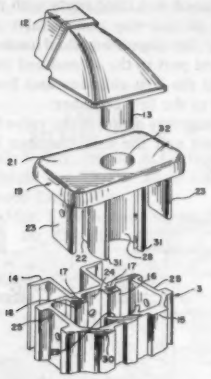
Filed Apr. 21, 1975, Ser. No. 570,156
Int. Cl.² B60P *7/06*
U.S. Cl. 296—43 **6 Claims**

4. For a highway vehicle having a removable cargo container including tarpaulin roof supporting bows;

a vertically extending hollow stake including longitudinally spaced transverse wall portions, inboard and outboard longitudinal wall portions extending between said transverse wall portions and a vertically extending stake bow socket portion formed on the interior of the outboard longitudinal wall intermediate said transverse wall portions, and

a replaceable stake protector cap adapted to overlie the stake and including a cap bow socket portion depending from the protector cap into the stake between said stake bow socket portion and said inboard longitudinal wall portion for vertical sliding coupling with said stake bow socket portion to define a vertically extending bow socket for receiving and supportably coupling a tarpaulin bow portion extendable through the protector cap, said stake bow socket portion having outer edge portions, and said cap

bow socket portion having outer edge portions interlocking in anti-rotational fashion with the outer edge portions of the stake bow socket portion consequent upon vertical



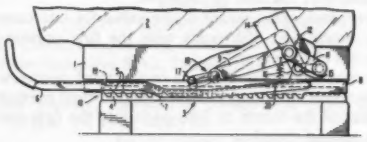
sliding coupling of the cap bow socket portion with respect to the stake bow socket portion preventing destructive rotational oscillation between the bow, protector cap and the stake.

4,042,276

SEAT, ESPECIALLY CO-DRIVER SEAT IN A MOTOR VEHICLE

Werner Breitschwerdt, Stuttgart, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

Filed Aug. 17, 1972, Ser. No. 281,281
Claims priority, application Germany, Aug. 17, 1971, 2141147
Int. Cl.[2] B60R *21/10*
U.S. Cl. 297—216 **17 Claims**



1. A seat for a vehicle equipped with safety belts operatively associated with the seat, characterized in that adjusting means are provided for permitting selective adjustment of the seat in the vehicle, means are connected to the seat-adjusting means and at least one of the safety belts for automatically initiating a predetermined displacement movement of the seat by a predetermined amount upon exceeding a predetermined load effective on the seat in the displacement direction if the seat is occupied by a person whose safety belt is not fastened.

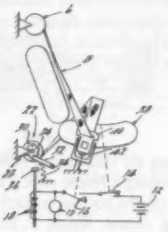
4,042,277

SEAT BELT SYSTEM

Robert C. Fisher, 4210 N. Dixie, West Palm Beach, Fla. 33407

Continuation of Ser. No. 605,667, Aug. 18, 1975, abandoned. This application Nov. 29, 1976, Ser. No. 745,663
Int. Cl.[2] A47B *35/00*
U.S. Cl. 297—388 **1 Claim**

1. A seat belt system for a vehicle comprising: a seat belt having a tongue thereon, a seat belt buckle, a seat belt retractor having a spool with a ratchet thereon and adapted to have one end of said seat belt wound thereupon, first resilient means normally biasing the spool of said retractor and said seat belt toward the retracted condition, a pawl engageable with the ratchet on said spool to effect locking thereof against protraction of said belt, second resilient means normally biasing said pawl toward engagement with the ratchet on said spool, an electromagnet, an electromagnet control circuit, means responsive to substantially full retraction of said belt for biasing said pawl out of engagement with the ratchet on said spool and into mechanical engagement with the said electromagnet while said electromagnet is in the deenergized condition, said electromagnet being energizable upon closure of a normally open switch connected in electrical series relation in said control circuit with said electromagnet for holding said pawl out of



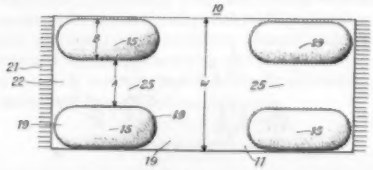
engagement with the ratchet on said spool, closure of said normally open switch being independent of the condition of said retractor, and a normally closed switch in said control circuit connected in electrical series relation with said normally open switch and electromagnet and movable to the open condition upon insertion of said belt tongue into said buckle whereby said electromagnet is deenergized permitting said pawl to move to the locked condition with respect to the ratchet on said spool retractor under the bias of said second resilient means.

4,042,278

DROWSING CHAIR PILLOW

Frank L. Jensen, Woods Cross, Utah, assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Apr. 12, 1976, Ser. No. 676,311
Int. Cl.[2] A47C *1/10*
U.S. Cl. 297—397 **1 Claim**



1. A pillow unit that may be draped over a chair back to serve as a headrest, comprising

a flexible sheet fitted with a pair of padded bolster sections that project beyond a first side of aid sheet, with the opposed second side of said sheet being a generally flat surface with the sheet in a draped mode, in which

the bolster sections are spaced apart by a distance that permits each bolster to contact the head of a user resting against both bolsters.

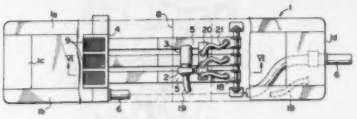
said sheet fitted with two pairs of said spaced bolster sections mounted on the said first side of the sheet so that each pair of bolster sections balance the other when the mid-section of the sheet is draped over the back of a chair, with each pair of bolster sections mounted at opposed end sections of the sheet, so that either pair of said bolster sections are alternately useable as head rests, dependent upon the orientation of the sheet when draped over the back of a chair.

4,042,279

APPARATUS FOR RECOVERING MINERALS, IN PARTICULAR MANGANESE NODULES, FROM THE BOTTOM OF THE WATER

Yoshio Asakawa, Koganei, Japan, assignor to Sumitomo Metal Mining Company Limited, Tokyo, Japan

Filed Sept. 14, 1976, Ser. No. 723,180
Claims priority, application Japan, Oct. 2, 1975, 50-119224
Int. Cl.² E02F *3/94*
U.S. Cl. 299—8 **14 Claims**



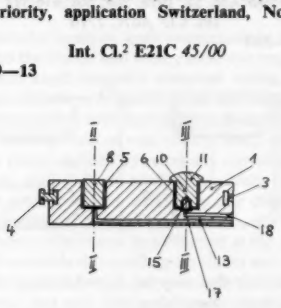
1. An apparatus for recovering minerals from the bottom of the water comprising a frame which is almost rectangular and has slide bodies on the bottom surface thereof, and at least one mineral floating means which is universally rotatably supported on the frame at an end thereof and is inserted the other end into a side opening of a collection chamber fixed to the frame, and said mineral floating means having the bottom surface projected from the bottom surface of the frame and being integrally constructed with a cylindrical surface member accommodated therewithin, a nozzle provided in adjacent with the outside of the cylindrical surface member for jetting the water along the bottom surface of said mineral floating means and a duct opened to both ends of the downstream of the water jetted from the nozzle and of the collection chamber, respectively, and provided at an angle, said collection chamber being connected to a suction pipe.

4,042,280

METHOD OF BREAKING UP OBJECTS

Louis K. Garbini, Abtwil, Switzerland, assignor to Kubatec Kunststoff- & Bautechnik AG, Eschen, Switzerland

Filed Nov. 12, 1974, Ser. No. 523,135
Claims priority, application Switzerland, Nov. 13, 1973, 15920/73
Int. Cl.² E21C *45/00*
U.S. Cl. 299—13 **15 Claims**



1. An installation for breaking up an object, comprising a carrier, a hydraulically operated thrust piston mounted in the carrier, and an explosive-operated thrust piston mounted in the carrier.

4,042,281

SERVICE AND EMERGENCY TRAILER VALVE

John M. Ury, Hazelwood, Mo., assignor to Wagner Electric Corporation, Parsippany, N.J.

Filed Apr. 15, 1976, Ser. No. 677,405
Int. Cl.² B60T *15/48*
U.S. Cl. 303—29 **4 Claims**

1. A valve comprising:

a. a housing having first and second chambers formed therein;

b. a first inlet port in the valve;

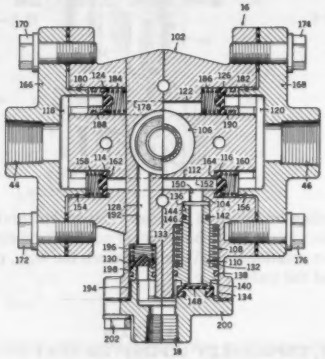
c. a second port in the valve;

d. a third port in the valve;

e. first passageway means in the valve for interconnecting the first, second and third ports with the first chamber;

f. a plurality of one-way check valve means in the first passageway for permitting fluid under pressure to pass from the first port to the second and third ports, from the first port to the first chamber and from the second and third ports to the first chamber;

g. second passageway means in the valve for interconnecting the first port and the first chamber bypassing the first passageway;



h. one-way check valve means in the second passageway for permitting fluid under pressure to pass from the first port to the first chamber;

i. pressure responsive valve means in the second chamber for sealingly separating a first portion of the second chamber from a second portion thereof;

j. a fourth port for inlet in the valve;

k. a fifth port for inlet in the valve;

l. third passageway means in the valve for interconnecting the fourth and fifth ports with the first portion of the second chamber; and

m. pressure responsive means in the third passageway for selectively admitting relatively higher fluid pressure from either of the fourth or fifth ports into the first portion of the second chamber

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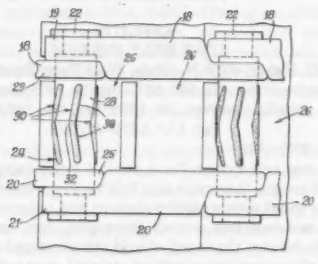
4,042,282

TRACK BUSHING PROVIDING EXTERNAL DEPOSITS OF WEAR RESISTANT MATERIAL

Glenn M. Haslett, Peoria, and Dennis L. Blunier, Danvers, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 24, 1975, Ser. No. 644,370
Int. Cl.² B60S *1/68;* B62D *55/20*
U.S. Cl. 305—11 **6 Claims**



1. For use with a sprocket of a track-type vehicle, a track pin

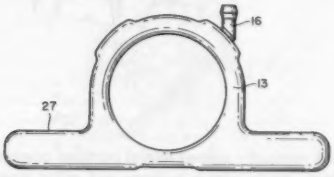
bushing seatable in a recess defined by the sprocket, said track pin bushing defining a track pin bushing outer surface, and a protrusion extending outwardly from said outer surface, the protrusion acting to force foreign material from the recess of the sprocket as the bushing seats in the recess, wherein the protrusion defined by the track pin bushing is an elongated protrusion angled relative to the longitudinal axis of the track pin bushing.

4,042,283

PILLOW BLOCK

Earl S. Cain, Portola Valley; Jerome A. Carlson, Woodside, and George E. Goodrich, San Carlos, all of Calif., assignors to Tribotech, Redwood City, Calif.

Filed Mar. 5, 1976, Ser. No. 664,163
Int. Cl.[2] F16C *35/12*
U.S. Cl. 308—15 **10 Claims**



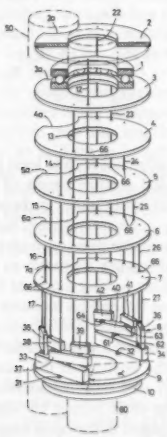
1. A pillow block including a bearing receiving flange extending outwardly from one face of a plate and adapted to receive and hold a bearing, the outer edges of said plate being bent to extend in the same direction as said flange, one portion of said bent outer edges forming a mounting surface generally parallel to the axis of the flange to provide a mounting base and other portions extending adjacent to said flange with spaced portions of said adjacent extending portions bent inwardly toward said flange to engage and support the flange.

4,042,284

THRUST BEARING ASSEMBLY

Norbert Coster, Luxembourg, Luxembourg, assignor to SOFISA (Societe Financiere S.A.), Luxembourg

Filed Apr. 16, 1976, Ser. No. 677,821
Claims priority, application Switzerland, Apr. 22, 1975, 5099/75; Mar. 26, 1976, 3817/76
Int. Cl.[2] F16C *27/08*
U.S. Cl. 308—219 **18 Claims**



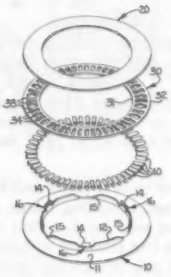
1. A thrust bearing assembly intended to support a rotating shaft, especially in a multiscrew extruder, comprising a support, two rows of coaxial bearing elements cooperating in pairs and thereby forming a line of bearings in tandem, said elements of one said row being rotating and integral with a first member consisting of said shaft, and said elements of the other said row being stationary and integral with a second member consisting of said support, and means acted upon by axial thrust exerted by said shaft for axially adjusting said elements of one of said rows to distribute said thrust equally on said bearings, wherein said adjusting means comprise a plurality of tilt means disposed between said row of adjustable elements and said member with which said elements are integral, each said tilt means being directly or indirectly biased by at least two said adjustable bearing elements respectively acting upon it one on each side of its tilting axis.

4,042,285

THRUST BEARING

Hans H. Dorsch, Cheraw, S.C., assignor to INA Bearing Company, Inc., Cheraw, S.C.

Filed Apr. 12, 1976, Ser. No. 676,242
Int. Cl.[2] F16C *33/38*
U.S. Cl. 308—235 **19 Claims**



1. A thrust bearing assembly comprising an annular cage, a plurality of rolling elements positioned in said cage, first and second bearing races positioned on opposite sides of said cage and having opposing surface portions defining respective annular raceways cooperating with said rolling elements, and latching means formed integrally with said first bearing race on the inner circumferential periphery thereof and extending therefrom and engagingly retaining said second bearing race to thereby maintain the components of the thrust bearing assembly in assembled relation.

4,042,286

APPARATUS FOR PROTECTION AND STORAGE OF PHOTOTYPESETTING EQUIPMENT

Richard S. Olson, deceased, late of Canby, Minn., and John E. Qualley, executor, P.O. Box 146, Canby, Minn. 56220

Filed Oct. 20, 1975, Ser. No. 623,598
Int. Cl.[2] A47F *3/06*
U.S. Cl. 312—129 **6 Claims**

1. An apparatus for the protection and storage of phototypesetting equipment including fonts and the protective sheaths in which fonts are carried comprising:

an enclosure having an access opening and an interior storage chamber fronting on said opening and extending rearwardly therefrom;

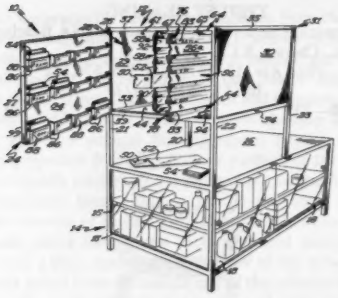
a generally upright panel having obverse and reverse sides and positioned within said chamber;

means movably mounting said panel to said enclosure for movement of said panel between a retracted position wherein said panel is wholly within said enclosure and an extended position wherein said panel protrudes from said enclosure through said access opening, said movable

mounting means retaining said panel in a generally upright plane during movement between extended and retracted positions;

font retaining means fixed to said panel and in cooperation with said panel defining a plurality of distinct, narrow, elongated, sheath receiving compartments closely adjacent said panel and extending in a front-to-rearward direction in said chamber, each compartment being constructed and arranged to receive and closely confine a single sheath and font in a generally upright plane substantially parallel to said panel and between said retaining means and said panel and to substantially inhibit lateral movement and bending of the sheath and the font;

said font retaining means including a plurality of elongated strips positioned in pairs on said panel and extending from front to rear on said panel, each said strip having a mounting flange fixed to said panel and a font retaining web connected to said mounting flange and spaced laterally outwardly from said panel, a first strip of each pair of strips having its font retaining web extending downwardly and the second strip of each pair of strips being positioned below said first strip and having its font retaining web extending upwardly toward and confronting said font retaining web of said first strip so said font retaining webs of said first and second strips of each pair of strips cooperate to retain a font and protective sheath therebetween; and



a door movably mounted to said enclosure for movement between an open position wherein said door is clear of said access opening and a closed position wherein said door fully obstructs said access opening to prevent dust from entering said chamber.

4,042,287

SERVICE UNIT, PARTICULARLY FOR A DOCTOR'S OR A DENTIST'S OFFICE

Jan-Ake Hallen, Brinketorpsvagen 3, Partille, Sweden (43300)

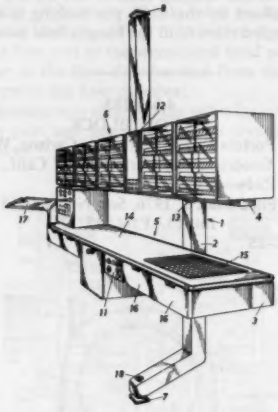
Filed Mar. 21, 1975, Ser. No. 560,648

Claims priority, application Sweden, Mar. 25, 1974, 7403958

Int. Cl.[2] A47B *53/00, 49/00*

U.S. Cl. 312—209 **4 Claims**

1. A dental service unit comprising in combination a U-shaped pillar stand, a workbench and at least one upper cupboard arranged above said workbench, each of said workbench and said one cupboard being fixedly-mounted on intermediate portions of said U-shaped pillar stand, the pillar stand including a vertical rotation axis located at outer ends of vertically spaced legs of said pillar stand, said vertical rotation axis extending generally through forward portions of said workbench and cupboard, said pillar stand including an intermediate portion substantially parallel to said vertically spaced legs and connected thereto by vertically spaced, lateral support portions, said work table projecting forwardly from said last-mentioned intermediate portion and said cupboard being mounted on the upper-most lateral portion, said vertically spaced legs of said pillar stand including support elements for respectively engaging vertically spaced support surfaces for maintaining said pillar stand in a relatively fixed position with respect to the vertically spaced support surfaces, said pillar stand being tubular and said vertically spaced lateral portions comprising hollow sections, inside which sections and pillar stand are arranged distrubution service ducts for water, drainage, and supply lines for air, electricity, telephone service, and the like.



4,042,288

EXTRUDED PLASTIC PANEL DRAWERS

Leon G. Litchfield, Youlgreave, England, assignor to L. B. (Plastics) Limited, England

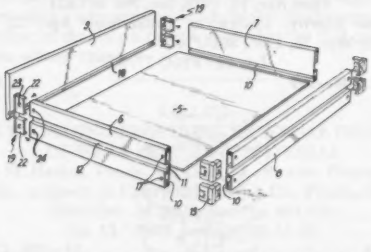
Division of Ser. No. 364,710, May 29, 1973, Pat. No. 3,901,572.

This application May 19, 1975, Ser. No. 578,382

Claims priority, application United Kingdom, Dec. 8, 1972, 56752/72

Int. Cl.[2] A47B *88/00*

U.S. Cl. 312—330 R **3 Claims**



1. A drawer construction in which at least the sides and back are formed from extruded plastics panels of identical section, the section of each panel being uniform throughout its length, each panel comprising a vertical sheet, said vertical sheets forming the inner walls of the drawer, intersecting at the corners of the drawer, and having a groove to receive a drawer bottom, each vertical sheet having a pair of hollow sections of rectangular cross-section formed on its outer side and defining a channel therebetween, which are identical except for the groove in the inner face of the lower section, the back of which channel is defined by the portion of the outer surface of said sheet disposed between said box-like sections and the panels being interconnected at each corner by identical upper and lower corner pieces engaged in the open ends of the respective upper and lower box-like sections, means to retain the corner pieces securely in engagement with said open ends, and a front panel connected to the drawer sides by connecting members

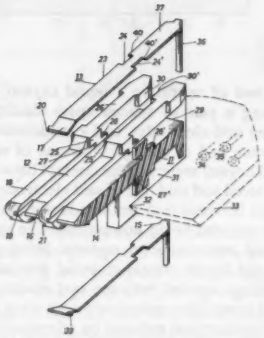
secured to the front panel and adapted to engage within the side panels.

4,042,289

PLUG CONTACT DEVICE INTENDED FOR MOUNTING ON CIRCUIT CARDS

Stig Teodor Heinonen, Järfälla, and Gustav Gunnar Johansson, Huddinge, both of Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Mar. 31, 1976, Ser. No. 672,448
Claims priority, application Sweden, Apr. 25, 1975, 7504816
Int. Cl.[2] H05K *1/10*
U.S. Cl. 339—17 LC 6 Claims



1. A plug contact device comprising: a body of insulating material, said body being provided with a plurality of elongated parallel grooves and ridges between the grooves, a pair of projections transversely extending from said ridges and straddling and protruding into each groove at an intermediate point along the groove, said projections having a given length along the axial direction of the groove, and a given thickness in the transverse direction, the edge at one end of each projection being provided with a slot extending along the projection in the axial direction of the groove and from the base of the groove a given height upward from said base, the edge at the other end of each projection having a lock shoulder extending from said ridges and protruding into each groove for a distance substantially equal to said given thickness, the distance along the axial direction of the groove from the base of the slot to the end of the lock shoulder being substantially equal to said given length; and a plurality of contact springs of conductive material each of said contact springs being positioned in one of said parallel grooves, each of said contact springs having a thickness less than the height of the slot in said projection, each of said contact springs being provided with a pair of axially extending notches for mating engagement by said projections, the depth of said notches being substantially equal to the thickness of the projections and the length of said notches being substantially equal to said given length along the axial direction of the grooves, whereby said contact springs are lockingly held against axial movement by one edge of the contact spring at a notch resting against the base of the slot in a projection and an opposite edge of the contact spring at the same notch abutting the locking shoulder of the same projection.

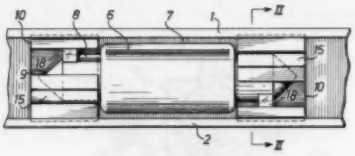
4,042,290

LIGHTING DEVICE

Georg Czitrom, Vaxjo, Sweden, assignor to Aneta Belysning AB, Vaxjo, Sweden

Filed Mar. 24, 1976, Ser. No. 669,969
Claims priority, application Sweden, Apr. 14, 1975, 7504278
Int. Cl.[2] H01R *33/04*
U.S. Cl. 339—52 R 5 Claims

1. Lighting device comprising an elongated support having a generally U-shaped cross-section, said support including electrically conductive surfaces extending respectively along the inside of the legs of said support, a pair of lamp holders made from an electrically insulating material displaceably arranged with respect to each other in said support, co-engaging releaseable means on said support and lamp holders for retaining said lamp holders in said support, an incandescent



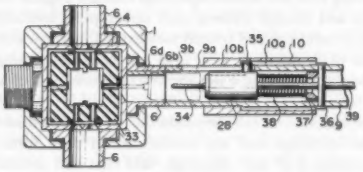
lamp of the type comprising a tubular section and an electrically conductive cap at each end thereof having a cylindrical section, each said cylindrical section being received in a corresponding one of said pair of lamp holders, and a contact spring on each said lamp holder connecting one cylindrical section of an end cap on said lamp with a corresponding one of said conductive surfaces extending along the inside of said support.

4,042,291

PIPE CONNECTING APPARATUS

Hideo Moriyama, Tokyo, Japan, assignor to Moriyama Sangyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 3, 1975, Ser. No. 538,263
Claims priority, application Japan, Feb. 2, 1974, 49-13917; Mar. 6, 1974, 49-25148; Mar. 14, 1974, 49-28502; Apr. 10, 1974, 49-39889
Int. Cl.[2] H01R *13/54*
U.S. Cl. 339—89 M 12 Claims



1. An electrical pipe connecting apparatus of a multiple structure adapted to contain electrical wiring for illumination facilities therein, comprising:

a. a hollow outer frame member of a polyhedral structure including at least two mating elements and serving as a branch base of the multiple piping, each face of the polyhedral structure having an opening defined therein;

b. a plurality of projecting pipes, having flanges formed thereon, extending from the interior of the outer frame and through said openings to the exterior of said outer frame;

c. an insulative core member, including electrical contacts fixedly mounted thereon, having a polyhedral configuration corresponding to that of said outer frame member and disposed within said outer frame member so as to simultaneously maintain said projecting pipes within said outer frame member by said flanges which are interposed between said core member and the interior walls of said outer frame member;

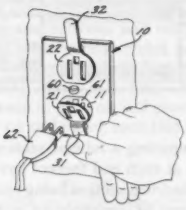
d. communication pipes, coupled with said projecting pipes, within which electrical conductors are provided so as to be connected to said electrical contacts of said core member; and

e. sleeves for coupling and fixing said projecting pipes to said communication pipes.

4,042,292
WALL PLATE STRUCTURE

Frank T. Chensky, 20013 Thornlake, Cerritos, Calif. 90701

Filed Aug. 11, 1975, Ser. No. 603,716
Int. Cl.[2] H01R *13/62*
U.S. Cl. 339—45 R 1 Claim



1. In combination with a wall mounted receptacle that includes first and second spaced, prong receiving outlets, each of said outlets capable of removably receiving a pair of electrical conducting prongs that project from an insulated plug mounted on a free end of an electrical conducting cord, a wall plate assembly, said assembly including:

a. a cover plate molded from a polymerized resin, said cover plate at least as great in transverse cross-section as that of said receptacle and adapted to conceal the latter when said cover plate overlies said receptacle, said cover plate having first and second openings that are aligned with said first and second outlets, said cover plate including first and second pairs of spaced tabs extending outwardly from said plate adjacent said first and second openings, said cover plate having a slot formed between each of said pair of tabs;

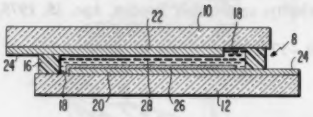
b. first and second release plates that in first positions overlie said openings and are conformed in plan form to the dimensions of said openings, said first and second plates each having a pair of spaced openings therein through which said pair of prongs of one of said plugs may extend to removably engage one of said prong receiving outlets; first and second handles that extend outwardly in opposite directions from said first and second plates; and first and second cylindrical fulcrums that extend outwardly from said first and second plates adjacent said first and second handles, said first and second cylindrical fulcrums pivotally and removably engaging said first and second pairs of tabs, said fulcrums being conformed for receipt between said tabs, said tabs having parallel surfaces extending vertically from said cover plate, each of said surfaces terminating at a free edge thereof in a turned extension, the respective extensions being directed toward each other to form a gap less than the sectional dimension of a respective fulcrum for insert of said fulcrums between said tabs and adjacent a respective slot; and,

c. first means for removably securing said cover plate to said receptacle for said cover plate and first and second release plates to conceal said receptacle and first and second outlets when said first and second cover plates are in said first position, with said first and second plates when manually moved from said first position to a second position displacing the one of said plugs most adjacent thereto from engagement with one of said outlets, and said release plates being removable from said cover plate without removing the latter from said receptacle.

4,042,293
LIQUID CRYSTAL DEVICES HAVING DIODE CHARACTERISTICS

Joseph John Hanak, Princeton; Ronald Norman Friel, Hamilton Square, and Lawrence Alan Goodman, East Windsor, all of N.J., assignors to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 430,595. This application July 14, 1975, Ser. No. 595,836
Int. Cl.[2] G02F *1/13*
U.S. Cl. 350—160 LC 3 Claims



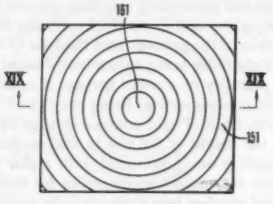
1. The method of operating a liquid crystal device of the type comprising a pair of spaced apart electrodes, a liquid crystal between said electrodes, and a semiconductor material disposed between and in contact with one of said electrodes and said liquid crystal material, the contact between said semiconductor material and said one of said electrodes being ohmic and the contact between said semiconductor material and said liquid crystal material being non-ohmic, The resistance associated with said semiconductor material being greater or less than that of said liquid crystal material depending upon the polarity of voltage applied between said electrodes,

said method comprising selectively activating and deactivating said liquid crystal material by selectively applying one or the opposite polarity voltages between said electrodes.

4,042,294
ILLUMINATED ELECTRO-OPTICAL DISPLAY APPARATUS

Lawrence A. Billings, Jr., Richardson; Daniel E. Evanicky, V. Joseph Hull, and Charles V. Ristagno, Dallas, all of Tex., assignors to Micro-Display Systems, Inc., Dallas, Tex.

Filed Mar. 17, 1976, Ser. No. 667,484
Int. Cl.[2] G02F *1/13*
U.S. Cl. 350—160 LC 11 Claims



1. In an electro-optical display apparatus having front and rear optically-transmissive panels for viewing from the front, said front and rear optically-transmissive panels being in spaced-apart relationship with a liquid crystal composition occupying the space therebetween and with means to impress a voltage between selected portions of said front and rear optically-transmissive panels, the improvements comprising:

(a) an illuminating means having a front surface and a rear surface positioned behind said rear optically-transmissive panel with the front surface of said illuminating means being adjacent the rear optically-transmissive panel, said illuminating means being adapted to uniformly distribute light across the front surface of said illuminating means; and

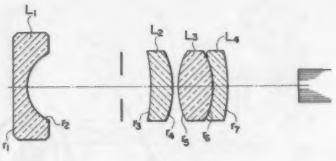
(b) a multi-cellular light diffusing panel intermediate said rear optically-transmissive panel and said front surface of said illuminating means, said light diffusing panel being adapted to diffuse and uniformly distribute light across at least a portion of said rear optically-transmissive panel.

4,042,295

RETROFOCUS-TYPE OBJECTIVE FOR ENDOSCOPES

Nobuo Yamasita, Tama, and Toshihiro Imai, Hachiouji, both of Japan, assignors to Olympus Optical Co., Inc., Japan

Filed Oct. 14, 1975, Ser. No. 622,115
Claims priority, application Japan, Oct. 15, 1974, 49-117749
Int. Cl.[2] G02B *13/04*
U.S. Cl. 350—202 2 Claims



1. A retrofocus-type objective for endoscopes comprising a front diverging lens group and rear converging lens group, said front diverging lens group comprising a negative lens, said rear converging lens group comprising a positive lens and a positive cemented doublet lens, said retrofocus-type objective for endoscopes being arranged to be focused on an object to be observed by keeping said front diverging lens group fixed and by moving said rear converging lens groups toward said front diverging lens group when the distance from said objective to the object to be observed becomes shorter, said retrofocus-type objective for endoscopes having numerical values as given below:

$r_1 = \infty$		
$d_1 = 0.6$	$n_1 = 1.51633$	$\nu_1 = 64.1$
$r_2 = 1.685$		
$d_2 = 5.36$		
$r_3 = -7.54$		
$d_3 = 1.0$	$n_2 = 1.69680$	$\nu_2 = 55.7$
$r_4 = -3.2$		
$d_4 = 0.2$		
$r_5 = 3.127$		
$d_5 = 1.6$	$n_3 = 1.62041$	$\nu_3 = 60.3$
$r_6 = -2.483$		
$d_6 = 0.55$	$n_4 = 1.84666$	$\nu_4 = 23.9$
$r_7 = -8.619$		
$f = 1.465$,	$f_B = 2.961$,	$f_F = -3.263$
$F_{NO} = 3.5$,	$2\omega = 88°40'$	
$m = 2.227$,	$n = 2.021$	

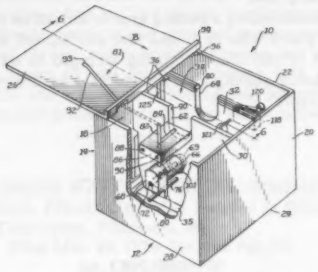
wherein reference symbols r_1 through r_7 respectively represent radii of curvature of respective surfaces of respective lenses, reference symbols d_1 through d_6 respectively represent thicknesses of respective lenses and airspaces between respective lenses, reference symbols n_1 through n_4 respectively represent refractive indices of respective lenses, reference symbols ν_1 through ν_4 respectively represent Abbe's numbers of respective lenses, reference symbol f represents the focal length of the lens system as a whole, reference symbol f_F represents the total focal length of the front lens group and reference symbol f_B represents the total focal length of the rear lens group.

4,042,296

FILM CARTRIDGE

Thomas R. Wells, Des Plaines, and Donald R. Jacobs, Niles, both of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Filed Jan. 28, 1976, Ser. No. 653,190
Int. Cl.[2] G03B *23/02*
U.S. Cl. 352—78 R 10 Claims



1. A cassette for removably mounting a reel containing a flexible strip of material, said cassette being adapted for use with a projector having an automatic feedout means, comprising:

a reel receptacle frame having an open top and an opening in one side thereof;

a slidably mounted cover adapted to close said open top to permit access to the interior of the receptacle frame for inserting or removing a reel of flexible material;

reel support means including a spindle mounted on the frame for rotatably mounting said reel, said spindle being movable between a first position for supporting the reel within the receptacle for feeding the strip material to said projector and a second position for releasing the reel; and

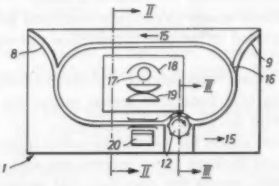
selectively operable cam means including an oblique cam slot on said cover in engagement with a protrusion on said spindle for moving said reel spindle between said positions in response to movement of said cover whereby the reel may be inserted into the receptacle and supported on the spindle in response to closure of the cover so that the flexible strip material may be removed from the reel through said opening by said automatic feedout means.

4,042,297

FILM STRIP PROJECTION EQUIPMENT

Reinhard Freisleben, Neubaldham, Germany, assignor to Soding TV GmbH & Co. Bild & Ton International, Munich, Germany

Filed Feb. 23, 1976, Ser. No. 659,985
Claims priority, application Germany, Apr. 17, 1975, 2516988
Int. Cl.[2] G03B *23/08, 23/02, 21/00*
U.S. Cl. 353—109 5 Claims



1. A film strip projection device for the projection of an endless running film strip comprising:

a projection optics system having a film trap through which said film strip passes, said film strip being open ended and flexible;

a closed substantially circular track formed in said projection device for guiding said film strip;

a transport device for engaging and driving said film strip around said track;

said film strip including first and second longitudinal edges;

a pair of spaced-apart wall plates disposed in said device, said wall plates being perpendicular to the flat faces of said film strip; and

said track including a guiding groove formed on each of said wall plates with only said first and second longitudinal edges of said film strip being arranged to travel in said respective guiding grooves and be guided thereby about said track.

4,042,298

DOCUMENT FILMING CAMERA

John A. Herrmann, Bloomington, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 19, 1976, Ser. No. 659,235

Int. Cl.[2] G03B *27/52*; G01D *9/42*; G03B *27/70*

U.S. Cl. 355—40 **13 Claims**

1. A continuous document-handling attachment for a document microfilm camera having a document feed roll, means for projecting images of the document as it moves past a photographic station on the document feed roll to a focal plane, means for advancing a film synchronously with the movement of the document feed roll, and an indexing mark exposure device for exposing a frame mark on the film as each document is filmed, said attachment comprising

a support for supporting a document to be photographed,

at least one wheel supported by a rotatable shaft to be driven from a said document to rotate said shaft,

document sensor means to produce electrical pulses as said wheel is rotated to indicate incremental movement of the document,

first counter means responsive to a predetermined number of pulses from said document sensor means for energizing said exposure device,

feed roll sensor means for generating pulses upon rotation of said feed roll through given increments, and

second counter means for counting said generated pulses from said feed roll sensor means, said second counter means being connected to said document sensor means and being reset to **0** when a pulse is generated from said document sensor means and said second counter means pulsing said first counter means when pulses are not produced by said document sensor means.

4,042,299

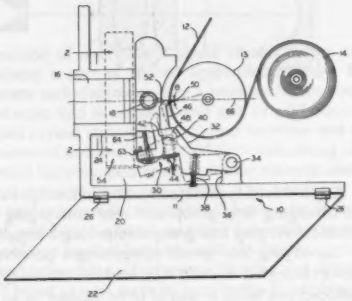
PHOTOGRAPHIC RECORDING MACHINE WITH IMAGE DESIGNATOR MARK OPTICAL SYSTEM AND ADJUSTING MEANS THEREFOR

Adolph J. Gawin, Skokie, and Robert F. Porazinski, Norridge, both of Ill., assignors to Bell & Howell Company, Chicago, Ill.

Filed Apr. 28, 1975, Ser. No. 572,575

Int. Cl.[2] G03B *27/52*

U.S. Cl. 355—40 **9 Claims**



2. In a photographic recording machine;

means for sequentially exposing images onto a photosensitive web;

removable access means associated with said machine whereby said web is inserted in or removed from said machine when said access means is in an open position;

an optical system for forming an image designator mark on said photosensitive web in a predetermined position in relation to each said image;

said optical system including a light source projecting means moveable from a first position adjacent said web to a second position removed from said web;

said light source projecting means including;

mounting means pivotally attaching said projecting means to said machine, whereby said projecting means pivots between said first and second positions;

spring bias means disposed between said machine and said projecting means to bias said projecting means toward said first position;

actuator means operatively connected between said access means and said light source projecting means to move said projecting means from said first position to said second position when said access means is open, and to move said projecting means from said second position to said first position when said access means is closed;

said actuator means including lever arm means pivotally attached to said machine at one end and disposed in abutting contact with said projecting means at the other end;

said lever arm means abutting and being moved by said access means,

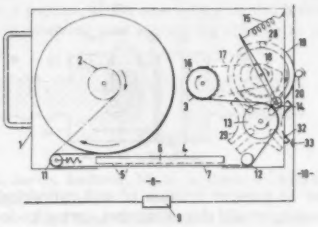
whereby when said access means are in said closed position, said projecting means is in said first position; and when said access means are in said open position, said lever arm means is enabled to move said projection means to said second position.

4,042,300

SELF-CONTAINED SINGLE OR MULTIPLE CASSETTES AND DRIVES

Harry Arthur Hele Spence-Bate, 1 Cheam Place, Morely, Australia (6062)

Filed July 14, 1975, Ser. No. 595,780
Claims priority, application Australia, July 18, 1974, 71404/74
Int. Cl.[2] G03B *27/60*
U.S. Cl. 355—73 3 Claims



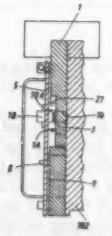
3. A cassette comprising a light excluding case, an unexposed film retaining means and an exposed film retaining means both mounted within said case, said unexposed and exposed film retaining means comprising a first reel and a second reel respectively, each reel adapted to hold roll film; a suction platen positioned between said first and second reels, said platen being movable in a back-and-forth manner in a direction perpendicular to the axes of said reels, guide means adapted to direct a roll film from said first reel over said platen to said second reel and roller means cooperating with clamp means and adapted to withdraw a length of roll film from said first reel to form a loop containing a length of film equal to the maximum back-and-forth travel of said platen whereby movement of said platen accomplishes film stepping without movement of the film relative to the platen.

4,042,301

APPARATUS FOR SUPPORTING AND POSITIONING WEBS OF PHOTOGRAPHIC MATERIAL IN COPYING MACHINES

Günter Heidrich, and Christian Götze, both of Munich, Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Sept. 23, 1975, Ser. No. 616,073
Claims priority, application Germany, Sept. 26, 1974, 2445997
Int. Cl.[2] G03B *27/62*
U.S. Cl. 355—75 11 Claims



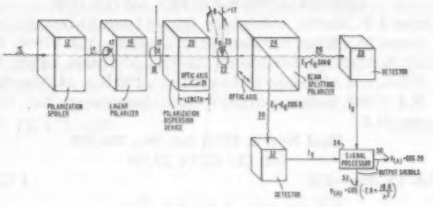
5. Apparatus for supporting and positioning manually insertable perforated webs of photographic material having data carrying strips in a copying machine, comprising a base; web advancing means installed in said base; a holder movable with respect to said base between a first and second position and having means for rendering said advancing means operative in said first position of said holder; web positioning means installed in said base to extend into the perforations of a web which is inserted and advanced by hand, said positioning means being movable between extended and retracted positions; means for retracting said positioning means in response to movement of said holder to said first position; a pressure plate normally overlying an exposure window in said base; additional positioning means movable with respect to said base between extended and retracted positions to enter the perforations of a manually inserted web having a strip when in said extended position; first resilient means for biasing said additional positioning means to said retracted position with a first force; second resilient means actuatable to bias said additional positioning means to said extended position with a greater second force; and means for actuating said second resilient means when said pressure plate overlies said window.

4,042,302

BROADBAND WAVELENGTH DISCRIMINATOR

John L. Wentz, Ellicott City, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 10, 1976, Ser. No. 665,463
Int. Cl.[2] G01J *3/00*
U.S. Cl. 356—74 10 Claims



5. Apparatus for determining the wavelength of incident narrow band radiation comprising:

means for randomizing the orientation of the polarization of incident radiation;

a linear polarizer for passing a portion of said randomized incident radiation through said linear polarizer;

a polarization dispersion device coupled to receive radiation from said linear polarizer in the direction of the optic axis of said polarization dispersion device;

a beam splitting polarizer to form a first and second output beam coupled to receive radiation from said polarization dispersion device;

means for detecting said first and second output beam to provide a first and second signal respectively indicative of the intensity of said first and second output beam; and

means for processing said first and second signals to provide a third signal indicative of the wavelength of said incident radiation.

4,042,303

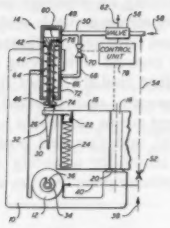
METHOD AND APPARATUS FOR AUTOMATED SAMPLING WITH AN ATOMIC ABSORPTION SPECTROMETER

Bernhard Werner Huber, Uberlingen, Germany, assignor to Bodenseewerk Perkin-Elmer & Co. GmbH, Uberlingen, Germany

Filed May 10, 1976, Ser. No. 685,007
Int. Cl.[2] G01J *3/30;* G01N *21/16*
U.S. Cl. 356—85 20 Claims

1. A method of introducing a sample to be analyzed through an introduction aperture into a graphite tube of a graphite tube cell of an atomic absorption spectrometer, comprising the steps of arranging a plurality of sample containers containing the samples to be analyzed in a row in a sample holding device, said sample containers being open at both ends, successively transporting said sample containers to an introduction device, inserting said sample container into the introduction aperture

of the graphite tube by means of said introduction device, transferring the sample into the graphite tube from said sample container, removing the sample container from the introduction aperture and returning it to the sample holding device after the introduction of the sample into the graphite tube, and then transporting the next subsequent sample container to the introduction device.

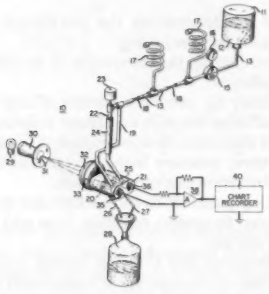


4,042,304

CHRISTIANSEN EFFECT DETECTOR

Archer J. P. Martin, Abbotsbury, Barnet Lane, Elstree, England; James M. Miller, 8 Oxford Lane, Madison, N.J. 07940; Robert J. Mathieu, 249 Morris Avenue, Mountain Lakes, N.J. 07046, and Alexander E. Lawson, Jr., 150 Rte. 24, Mendham, N.J. 07945, assignors to GOW-MAC Instruments, Inc., Madison, N.J.

Filed Nov. 6, 1972, Ser. No. 304,096
Int. Cl.[2] G01N *21/46*
U.S. Cl. 356—128 **1 Claim**



1. A Christiansen effect detector comprising means for directing collimated light along a line through particulate matter immersed in a liquid, means for detecting intensity of the light transmitted through the matter and the liquid, cell means filled with the particulate matter and arranged for retaining the particulate matter and the liquid in a fixed length along the line of light wherein light emerging from the cell means forms a center beam and a halo, said detecting means positioned to determine intensity of light in the halo, means for blocking the center beam from impinging upon the detecting means, and means for flowing the liquid through the cell.

4,042,305

QUICK CHANGE SNAP LOCK CONNECTOR

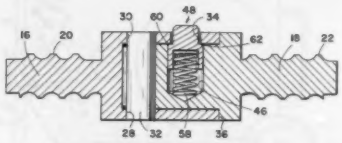
George E. Vincent, 110 N. 153rd East Ave., Tulsa, Okla. 74116

Filed Aug. 28, 1975, Ser. No. 608,459
Int. Cl.[2] F16B *7/00*; F16D *1/10*
U.S. Cl. 403—14 **7 Claims**

1. A connector for a flexible rotating shaft comprising:

a. a sleeve member having one end closed, a shaft connector means secured to the outer side of the closed end of the sleeve member, a transversely disposed torque bar secured inside the sleeve member adjacent the closed end thereof;

b. an elongated solid cylindrical segment having outside diameter substantially equal to the inside diameter of said sleeve number for selective insertion therein, a flange member secured to one end of the cylindrical segment, shaft connector means secured to the outside of the flange member opposite the cylindrical segment, a transversely disposed slot provided in the opposite end of the cylindrical segment for slidably receiving the torque bar therein when the cylindrical segment is inserted into the sleeve



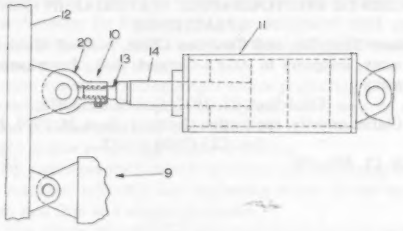
member to prevent rotation of said cylindrical segment with respect to said sleeve member, spring loaded depressable latch pin carried by the cylindrical segment, between said slot and said flange member, a transversely disposed bore provided in the sleeve member for receiving said latch pin therein when the cylindrical segment is fully inserted into the sleeve member with said torque bar disposed in the said transverse slot and transversely disposed bore provided in the sleeve member for receiving the latch pin is of greater diameter than said latch pin sufficient to prevent said latch from taking torqueloads when the connector is rotated.

4,042,306

CONTROLLABLE CONNECTING APPARATUS

Kenneth R. Murray, Mentor, Ohio, assignor to Towmotor Corporation, Mentor, Ohio

Filed Aug. 24, 1976, Ser. No. 717,056
Int. Cl.[2] F16B *7/18*
U.S. Cl. 403—118 **8 Claims**



1. Connecting apparatus providing a pivotal connection for controllably securing an actuating element at a preselected attitude, comprising:

said actuating element having an end portion, threads on said end portion, and at least one slot extending through the threads and longitudinally along the end portion;

an eye element having a longitudinal axis and first and second end portions and first and second ends, said first end portion having an opening extending therethrough substantially perpendicularly to the axis and said second end portion having a first threaded opening mateable with the threads of the actuating element and extending along the eye element axis, a second threaded opening at the second end portion and extending substantially perpendicularly to the eye element axis, and a slot at the eye element second end extending substantially perpendicularly to the eye element axis;

a holding element of general "U" configuration having first

and second legs and a middle portion in the installed position of the eye element on the actuating element, said first leg being of a size sufficient for extending along the actuating element slot, said middle portion being of a size sufficient for positioning in the slot of the eye element second end, and said second leg being of a construction sufficient for substantially completely encompassing the second threaded opening; and

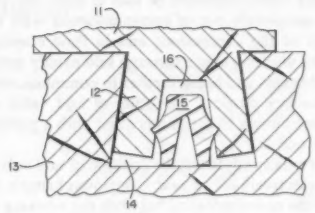
threaded means for mating with the threads of the second threaded opening of the eye element, extending over at least a portion of the second leg of the holding element and maintaining said second leg relative to said eye element.

4,042,307

JOINING

Arthur B. Jarvis, Andover, Mass., assignor to Bose Corporation, Framingham, Mass.

Filed Sept. 2, 1976, Ser. No. 719,942
Int. Cl.[2] F16B *2/14*
U.S. Cl. 403—290 **4 Claims**



1. A joint comprising,

a first piece of material having a projection with a groove,

a second piece of material having a slot embraced by angled walls with the width of the slot opening slightly greater than the width of said projection and less than the slot width at its base,

and wedge means located within said slot and said groove, for expanding said groove and urging said projection into engagement with the walls beside said slot,

said wedge means being formed with a slit having an opening adjacent to the base of said slot.

4,042,308

MODULAR ROADWAY FOR A TRANSPORTATION SYSTEM

Mark Freedman, Cinnaminson, N.J., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

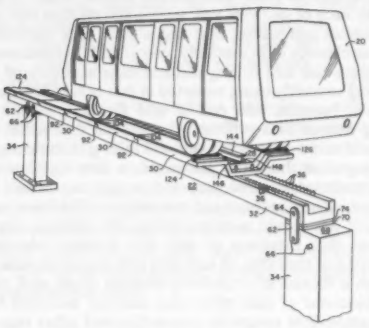
Filed Feb. 18, 1976, Ser. No. 658,947
Int. Cl.[2] E01C *1/00*
U.S. Cl. 404—1 **10 Claims**

9. In roadway apparatus for a transportation vehicle for carrying passengers and directed by guide wheels depending from said vehicle and engaging a guide member, the combination of;

a spinal beam having a channel formed between two side members;

a plurality of cantilevered deck modules successively supported along said spinal beam to provide a pair of running surfaces for the transportation vehicle,

with each deck module having a web section for supporting the guide member between the pair of running surfaces and having a cavity within said web section, and;



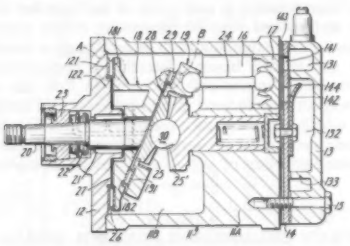
means filled within each said cavity for attaching the deck module associated with that cavity to the spinal beam.

4,042,309

REFRIGERANT COMPRESSOR

Masaharu Hiraga, Isesaki, Japan, assignor to Sankyo Electric Company, Limited, Isesaki, Japan

Filed Aug. 26, 1975, Ser. No. 608,002
Claims priority, application Japan, Aug. 26, 1974, 49-102116[U]; Aug. 26, 1974, 49-102117[U]
Int. Cl.[2] F04B *1/12;* **F16C** *33/46, 33/58*
U.S. Cl. 417—269 **9 Claims**



1. A refrigerant compressor in which pistons are reciprocated within respective cylinders by a wobble plate member driven by a wedge-shaped rotor member secured on a drive shaft, a generally cylindrical housing which contains said wobble plate member and said wedge-shaped rotor, a first end plate defining a discharge chamber having inlet and outlet means mounted on one end of said housing, a second end plate mounted on, and closing, an opposite end of said housing, said drive shaft being rotatably borne in said second end plate and extending from the exterior to interior of said housing, said wedge-shaped rotor member being mounted and fixed on an inner end portion of said drive shaft to be rotated together with said drive shaft, a first anti-friction thrust bearing assembly being mounted between an inner end surface of said second end plate and one end surface of said wedge-shaped rotor member and within a first annular space defined by a first annular recess formed in said inner end surface of said end plate and a second annular recess formed in said one end surface of said wedge-shaped rotor member, said wobble plate member being closely mounted, and relatively rotatably borne, on the other end surface of said wedge-shaped rotor member, said other end surface being formed to incline to said drive shaft, and a second anti-friction thrust bearing assembly mounted between said inclining end surface of said wedge-shaped rotor member and an end surface of said wobble plate member facing said inclining end surface and within a second annular space which is defined by a third annular recess

formed in said inclining surface of said wedge-shaped rotor member and a fourth annular recess formed in said end surface of said wobble plate member, the improvement which comprises: each of said first and second anti-friction thrust bearing assemblies comprising first and second race members and a rolling element cage assembly, one of said first and second race members and said rolling element cage assembly of said first bearing assembly being mounted in one of said first and second annular recesses, said one of said first and second recesses being formed of a sufficient depth such that radial displacement of said race member and said rolling element cage assembly mounted therein is prevented, a first ring member of a wear-resistant material provided in said one of said first and second annular recesses and covering a radial inner wall defining said one of said annular recesses, the other of said first and second race members of said first bearing assembly being mounted in the other of said first and second annular recesses which is formed of a relatively shallow depth such that radial displacement of said other race member mounted therein is prevented, first means for preventing said other race member of said first bearing assembly from rotation in said other annular recess, one of said first and second race members and said rolling element cage assembly of said second bearing assembly being mounted in one of said third and fourth annular recesses which is formed of a sufficient depth such that radial displacement of said race member and rolling element cage assembly mounted therein is prevented, a second ring member of a wear-resistant material therein which covers a radial inner wall defining said one annular recess, said other race member of said second bearing assembly being mounted in the other of said third and fourth annular recesses which is formed of a relatively shallow depth such that radial displacement of said other race member mounted therein is prevented, and second means for preventing said other race member of said second bearing assembly from rotation in said other of said annular recesses, said first and second rotation-preventing means comprising projections axially extending from said other race members of said first and second bearing assemblies, respectively, said projections being respectively received in first and second grooves respectively formed in said other of said annular recesses in which said other race members of said first and second bearing assemblies are respectively mounted and which extend from said other of said annular recesses, respectively.

4,042,310

SCREW COMPRESSOR CONTROL MEANS

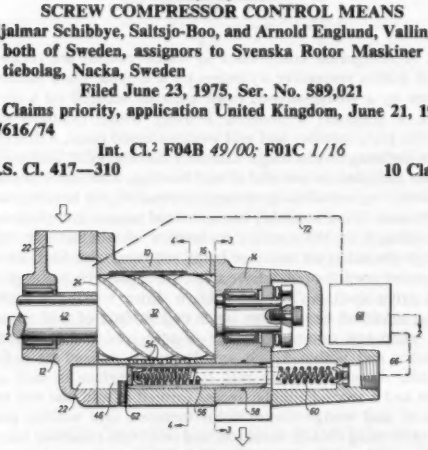
Hjalmar Schibbye, Saltsjo-Boo, and Arnold Englund, Vallingby, both of Sweden, assignors to Svenska Rotor Maskiner Aktiebolag, Nacka, Sweden

Filed June 23, 1975, Ser. No. 589,021

Claims priority, application United Kingdom, June 21, 1974, 27616/74

Int. Cl.[2] F04B *49/00*; F01C *1/16*

U.S. Cl. 417—310 **10 Claims**



1. In a screw compressor comprising a casing with a working space disposed therein in the shape of two intersecting cylindrical bores with parallel axes, a high pressure end wall at one end thereof, a low pressure end wall at the other end thereof, intermeshing male and female rotors disposed in said working space in sealing engagement with said casing and the end walls thereof and having helical lands and intervening grooves with a wrap angle of less than 360°, said male rotor having the major portion of its lands and grooves outside the pitch circle thereof and with its flanks substantially convex, and said female rotor having the major portion of its lands and grooves inside the pitch circle thereof and with its flanks substantially concave, a low pressure port adjacent said low pressure end wall, a high pressure port at the end of said working space opposite from said low pressure port and with said ports being located substantially on opposite sides of a plane through the axes of said bores, an inlet channel in said casing in flow communication with said low pressure port and an outlet channel in said casing in flow communication with said high pressure port,

means for varying the volumetric capacity of the screw compressor, comprising:

at least one valve bore parallel to the axes of the rotors and disposed on the high pressure side of said plane through the axes of the rotor bores;

a plurality of axially spaced overflow channels in said casing and in communication with the working space;

an axially adjustable valve body disposed in said at least one valve bore and sealingly cooperating with the barrel walls of the at least one valve bore to divide said valve bore into two valve chambers;

one of said valve chambers of said at least one valve bore being completely out of communication with the outlet channel of the compressor and in flow communication with the working space through said axially spaced overflow channels and being further in communication with a low pressure channel, the other of said valve chambers being selectively in communication with a pressure liquid source; and

means for axially adjusting the position of said valve body so as to selectively block said overflow channels for variation of the communication between the working space and the at least one valve bore through said overflor channels.

4,042,311

PUMP FLUID MOTOR CARRYING SPOOL VALVE FOR DISTRIBUTOR VALVE ACTUATION

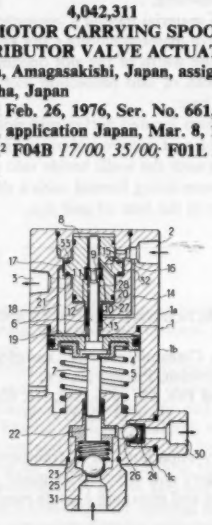
Keitaro Yonezawa, Amagasakishi, Japan, assignor to Aioi Seiki Kabushiki Kaisha, Japan

Filed Feb. 26, 1976, Ser. No. 661,549

Claims priority, application Japan, Mar. 8, 1975, 50-28210

Int. Cl.[2] F04B *17/00, 35/00*; F01L *25/06*

U.S. Cl. 417—401 **7 Claims**



1. In a fluid engine having a single acting cylinder for converting the pressure energy of an operating fluid to reciprocating actuation of a piston in a cylinder chamber, a directional control valve which alternately connects the cylinder chamber to an operating fluid inlet port, to force the piston downward

by the pressure of the operating fluid against a spring biasing force, and to an operating fluid outlet, to permit return of the piston upwardly by the spring biasing force, and a master valve to operate the directional control valve, the improvement comprising:

a. a piston rod on said piston,

b. a spool on said piston rod,

c. a reciprocably movable disc comprising said control valve, and said piston rod passing through said disc, and

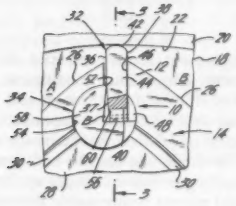
d. a pair of valve seats in said master valve additionally forming packings, one of said valve seats being in said disc and the other exterior of said disc, said pair of valve seats cooperating with said piston rod and its spool to alternately perform simultaneous respective sealing and unsealing of operating fluid to effect a reciprocation of the disc, thereby either permitting operating fluid to enter the cylinder chamber or venting operating fluid from the cylinder chamber, so as to cause movement of said piston.

4,042,312

APEX SEAL ASSEMBLY

Edmund Douglas Betts, Gurnee, Ill., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Aug. 16, 1976, Ser. No. 714,564
Int. Cl.² F04C *27/00*
U.S. Cl. 418—121 **12 Claims**



1. An improved apex seal assembly for each of the apex portions of a rotary piston having opposite wall surfaces and contiguous peripheral surfaces intersecting each other at the apex portions, the apex seal assembly comprising:

a. a slot in the apex portion extending axially through the piston side wall surfaces and radially inwardly from the peripheral surfaces of the piston;

b. a cylindrical-shaped bore in the apex portion disposed radially inwardly relative to the slot and extending axially through the piston side wall surfaces to intersect and communicate with said slot;

c. a seal blade means having a sealing end surface and a bottom surface receivable in said slot and dimensioned to extend at least to the planes of the opposite side wall surfaces of the piston and with the bottom surface lying in the slot and the sealing end surface lying outwardly of the slot;

d. an elongated cylindrical-shaped intermediate seal means receivable in said bore for rotative movement about its longitudinal axis relative to the bore and seal blade means;

e. said intermediate seal means having a cut-out portion in communication with said slot and forming at least one sealing arris; and

f. a spring disposed in the cut-out portion and between the bottom surface of said seal blade means and a wall of the cut-out portion to exert a force on said seal blade means and on the intermediate seal means at a point offset from the latter's rotational axis to thereby urge the intermediate seal means to rotate about said axis relative to the seal blade means and maintain the sealing arris in engagement with the seal blade means.

4,042,313

METHOD OF IMPARTING COLOR TO FIRES

Richard H. Pierce, Broomall, Pa., assignor to Philadelphia Quartz Company, Valley Forge, Pennsylvania

Filed Mar. 19, 1976, Ser. No. 668,387
Int. Cl.² C10L *10/00*; C06B *43/00*
U.S. Cl. 431—4 **4 Claims**

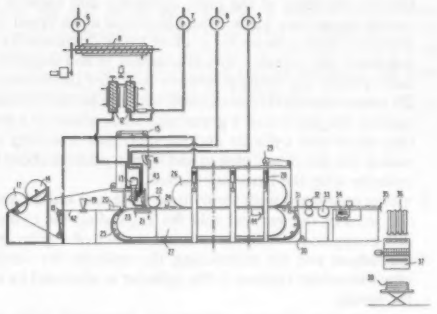
1. In the burning of combustible materials, a method of imparting color to the flames, comprising; adding granules to burning combustible materials whereby the granules soften and become bonded to the combustibles and upon burning impart color to the flames; said granules consisting essentially of metal salt(s), one or more of which is selected from the group of metals that produce colored flames on decomposing in a fire, potassium or lithium silicate solids water, and a bulking agent selected from the group consisting of sand, amorphous silica and microcrystalline silica.

4,042,314

APPARATUS FOR THE CONTINUOUS MANUFACTURE OF PHENOLIC RESIN FOAM IN ENDLESS SHEETS

Klaus Brüning; Hans Jünger; Wolfgang Pungs; Peter Rheinfeld, all of Troisdorf; Franz Weissenfels, and Michael Wienand, both of Siegburg, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Germany

Division of Ser. No. 311,913, Dec. 4, 1972, Pat. No. 3,885,010.
This application Oct. 9, 1974, Ser. No. 513,404
Claims priority, application Germany, Dec. 2, 1971, 2159726
Int. Cl.² B29D *27/04*
U.S. Cl. 425—89 **13 Claims**

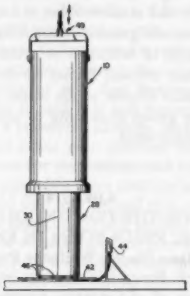


1. In an apparatus for the continuous manufacture of phenolic resin foam wherein the components of the foam are stored in storage means operatively associated with means for mixing the components and for distributing the resulting mixture to a temperature-controllable double belt press having an upper and a lower belt defining a molding zone therebetween, the improvement which comprises means for cooling the phenolic resin component to a desired premix temperature operatively associated with said storage means, a first mixer means downstream of the cooling means for premixing the cooled phenolic resin component with a blowing agent, a second mixer means downstream of the first mixer means for mixing the premix of phenolic resin and blowing agent with foam additives and a curing agent; distributing means including means operatively associated with said double belt press for directing the foamable resin-containing reaction mixture from the second mixer means onto a substrate of the lower belt of the double belt press, means operatively associated with said double belt press for measuring the foaming pressure between the lower belt and the upper belt of the press and means for adjusting the foaming pressure in response to the measured foaming pressure by varying the vertical spacing between the upper and the lower belt of said double belt press.

4,042,315
APPARATUS FOR MAKING CONCRETE PIPE

Norman Ottmann, Simsbury, and Walter Strever, Cromwell, both of Conn., assignors to Atlantic Pipe Corporation, Plainville, Conn.

Division of Ser. No. 547,333. This application Nov. 28, 1975, Ser. No. 635,980
Int. Cl.[2] B28B *21/14, 21/18*
U.S. Cl. 425—392 3 Claims



1. Apparatus for the vibration treatment of green concrete pipe comprising:

a. a cylindrical jacket within which the pipe is formed,

b. a vertically split upright and hollow cylinder operatively associated with said jacket and expandable and contractable radially and having a diameter approximating the internal diameter of the pipe, upwardly and radially inwardly projecting guide means mounted at an upper end portion of said cylinder for guiding a pipe downwardly on and about the cylinder, means attached to and supporting said cylinder for rotation relative to a pipe thereabout,

c. lift means operatively associated with the jacket for transporting the jacket and a green pipe therewithin to a position above said cylinder and for thereafter lowering and raising the jacket and pipe to and from a position about the cylinder with the latter contracted,

d. means connected with the cylinder adjacent and on opposite sides of the vertical split for expanding the cylinder into engagement with the internal surface of a green pipe thereabout and for contracting the cylinder for vertical pipe movement relative to the cylinder as aforesaid by said lift means,

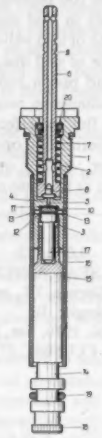
e. at least one vibrator operatively associated with said cylinder for vibrating the same in an expanded condition and thereby vibrating a green pipe thereabout whereby to compact, to eliminate voids, and to relieve residual forming stresses in the latter, and horizontal support means operatively associated with the cylinder for engaging a pipe positioned about the cylinder at its lower end surface and for supporting the same independently of the cylinder and for thus accommodating incremental cylinder rotation relative to the pipe during said vibration.

4,042,316
GAS LIGHTER BURNER

Peter Rabe, Muhlheim (Main), Germany, assignor to Rowenta-Werke, GmbH, Germany

Filed Jan. 19, 1976, Ser. No. 650,206
Claims priority, application Germany, Jan. 21, 1975, 2502138
Int. Cl.[2] F23Q *2/16*
U.S. Cl. 431—344 2 Claims

1. A gas lighter burner comprising an elongated burner housing having an axially extending fuel passage formed therein, a porous, compressible throttle disc seated against the entrance end of said fuel passage, the periphery of said throttle disc being exposed to a fuel supply of liquid gas under pressure, an elongated pressure device retained in said housing and having one end disposed against said throttle disc, and an adjustment screw threadedly engaged in said housing for adjusting the position of said pressure device relative to said throttle disc, the surfaces of said pressure device, burner housing and adjustment screw being exposed to said liquid gas whereby to provide good heat transmission between said surfaces and said fuel supply of liquid gas, said pressure device being at least partially formed of a different material than said

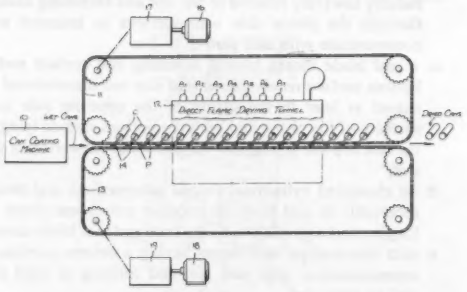


housing, said adjustment screw, and said throttle disc and having a different temperature coefficient of expansion whereby a desired flow of fuel through said fuel passage is maintained despite atmospheric and vaporization temperature variations as a result of relative changes in the axial dimension of said pressure device in response to said temperature variations and the resulting pressure changes applied by said pressure device to said porous compressible throttle disc.

4,042,317
DIRECT FLAME APPARATUS FOR DRYING CAN COATINGS

Edward S. Flynn, New Rochelle, N.Y., assignor to Flynn Burner Corporation, New Rochelle, N.Y.

Filed Nov. 10, 1975, Ser. No. 630,350
Int. Cl.[2] F27D *3/12*
U.S. Cl. 432—124 11 Claims



1. Apparatus for drying wet coatings applied to the outer surface of cylindrical cans comprising:

A. a drying tunnel having a series of assemblies mounted therein at spaced positions; and

B. conveyor means to advance the cans through said tunnel in a continuous train, whereby each can passes the series of assemblies, said conveyor means being constituted by an endless chain having upwardly tilted pins extending

therefrom from which said cans are hung whereby the bottom of each can occupies a higher position in said tunnel than the mouth thereof, each of said assembles including a direct flame burner element supplied with a combustible air-gas mixture to project a main flame in sheet form which impinges across the outer surface of an advancing can and means including a source of secondary air to project air curtains with sufficient velocity to flank both sides of said flame and to impinge across said surface to confine the intense heat of said flame to a limited sector on the advancing can and to prevent ignition of the coating despite said intense heat, said assemblies being arranged to apply more heat to the bottom end of the cans than to the mounts thereof to compensate for the temperature gradient created by the heat sink effect produced by the bottom end.

4,042,318

APPARATUS FOR THE CONTINUOUS MELTING OF SALTS USED FOR MODIFYING THE PROPERTIES OF ARTICLES OF GLASS OR SIMILAR MATERIALS

Johannes Franke; Kurt Kessler, both of Jena; Wolfgang Muller, Berlin; Heinz Sauerbier, Camburg; Kurt Schneider, and Karl Unbehaun, both of Jena, all of Germany, assignors to VVB Haushalts- und Verpackungsglas, Weisswasser OL, Germany

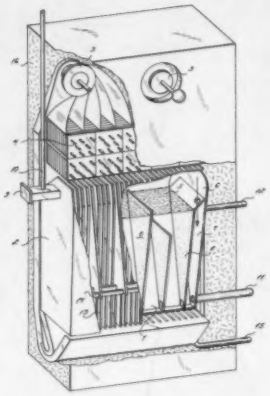
Filed July 18, 1975, Ser. No. 597,052

Claims priority, application Germany, July 31, 1974, 0318021

Int. Cl.[2] F27B *14/08*

U.S. Cl. 432—210 **3 Claims**

1. Apparatus for the continuous melting of salts which are to be used to modify properties of objects of glass or similar materials, the apparatus comprising an outer vessel, an inner vessel nested in the outer vessel with an annular chamber for heat exhange fluid being formed between the outer vessel and the inner vessel, ribs on the outer walls of the inner vessel for guiding the heat exchange fluid and assisting heat exchange from the heat exchange fluid to the inner vessel, means for transferring heat to the heat exchange fluid, means for circulating the heat exchange fluid through said chamber, means for admitting into the inner vessel the salt to be melted, the inner vessel having an upper portion of a semi-circular profile defining a radiant heating surface for radiating heat downwardly onto the salt and having a lower portion of approximately triangular to parabolic profile defining a conduction heating surface for transferring heat to the salt by conduction, the



upper surface of the lower portion to be formed by the salt charged to the inner vessel defining a melting surface and the ratio of the area of the radiant heating surface of the upper portion to the melting surface defined by the upper surface of the lower portion being in the range of 1:4:1 to 1.57:1 and the ratio of the area of the conduction heating surface to the melting surface being in the range of 2.5:1 to 4:1.

4,042,319
DYE-BATH OXIDANTS

Elliot H. Baum, Spring Valley, N.Y., and Gerald R. Ferrante, Edison, N.J., assignors to Kewanee Industries, Bryn Mawr, Pa.

Filed Oct. 12, 1976, Ser. No. 731,117
Int. Cl.[2] C09B *9/00, 49/00;* D06P *1/22;* A61L *13/00*
U.S. Cl. 8—35 3 Claims

1. A dye bath oxidant for leuco sulfur or vat dyes after said dyes have been adsorbed on fibers, said oxidant consisting essentially of about 40–80 parts by weight alkali bromate and about 20–60 parts by weight alkali iodate, the alkali in each instance being selected from the group consisting of sodium and potassium.

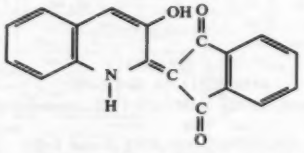
2. A method of oxidizing leuco sulfur or vat dyes after said dyes have been adsorbed on fibers which comprises applying to said dyes, in acid dye bath, an oxidizingly effective amount of an oxidizing agent consisting essentially of about 40–80 parts by weight alkali bromate and about 20–60 parts by weight alkali iodate, the alkali in each instance being selected from the group consisting of sodium and potassium.

4,042,320
ANIONIC AND NONIONIC EMULSIFIED DYE SUSPENSION WITH FORMALDEHYDE AND HYDROTROPIC AGENT

Carl Becker, Basel; Jacques Wegmann, Bettingen, and Andres Schaub, Biel-Benken, all of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Continuation-in-part of Ser. No. 506,775, Sept. 17, 1974, Pat. No. 3,997,828. This application May 2, 1975, Ser. No. 574,042
The portion of the term of this patent subsequent to Aug. 31, 1993, has been disclaimed.
Claims priority application Switzerland May 9, 1974, 6374/74; Sept. 2, 1974, 11869/74; Dec. 18, 1974, 16894/74
Int. Cl.[2] D06P *1/613*
U.S. Cl. 8—39 C 7 Claims

1. A composition consisting essentially of
40 to 60 percent by weight of the dyestuff of the formula



0.1 to 5 percent by weight of the sodium salt of an anion-active condensation product of naphthalenesulphonic acid with formaldehyde, 1 to 3 percent by weight of cetyl-stearyl alcohol, etherified with 25 moles of ethylene oxide,
a fungicidal amount of a 35% aqueous formalin solution,
an effective amount of 1,2-propylene glycol as an antifrost agent,
5 to 20 percent by weight of urea, and
20 to 30 percent by weight of water.

4,042,321
TANNING OF HIDES

Klaus Bäcker, Leverkusen; Helga Heinze, Cologne; Wolfhard Luck, Leverkusen, and Heinrich Spahrkäs, Bergisch-Neukirchen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Apr. 29, 1975, Ser. No. 573,282
Claims priority, application Germany, May 18, 1974, 2424301; May 18, 1974, 2424300
Int. Cl.[2] C14C *3/06*
U.S. Cl. 8—94.26 11 Claims

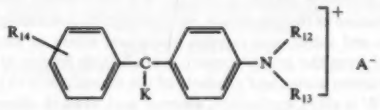
1. In the chrome-tanning of hides to produce leather wherein a hide is pickled, pretanned with a chromium (III) salt, and full tanned with a tanning mixture containing a chromium (III) salt, an acid-binding agent and a polycarboxylic acid or salt thereof, the improvement which comprises employing as said polycarboxylic acid or salt thereof at least 1.6 moles per mole of Cr_2O_3 in the chromium (III) salt employed for full tanning of an aliphatic dicarboxylic acid of 4 to 6 carbon atoms or an aromatic dicarboxylic or tricarboxylic acid containing 8 to 13 carbon atoms or an alkali metal salt thereof, the total quantity of Cr_2O_3 employed in pretanning and full tanning ranging from 1.2 to 2% by weight of the hide, full tanning being carried out with up to 100% of the tanning liquor based on the weight of the hide to a final pH of the liquor of at least 3.6.

4,042,322
PROCESS FOR DYEING ANIONICALLY MODIFIED SYNTHETIC FIBER MATERIALS

Hans-Peter Kühlthau, Leverkusen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

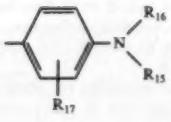
Division of Ser. No. 564,104, is a division of Ser. No. 299,658, Oct. 24, 1972, Pat. No. 3,925,015. This application June 29, 1976, Ser. No. 700,893
Claims priority, application Germany, Oct. 23, 1971, 2152948
Int. Cl.[2] D06P *5/00*
U.S. Cl. 8—168 R 3 Claims

1. In the process of dyeing an anionically modified fiber material by exhaustion from a dyebath consisting essentially of a cationic dyestuff dissolved in halogenated hydrocarbon the improvement comprising the use as said cationic dyestuff a dyestuff soluble in said halogenated hydrocarbon and having the formula

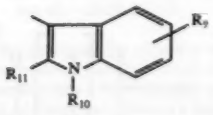


in which
A^- is a non-lipophilic anion;
R_{12} is hydrogen, alkyl, aralkkyl, cycloalkyl or aryl;
R_{13} is hydrogen, alkyl, cycloalkyl or aralkyl, or R_{12} and R_{13} together with the nitrogen atom form a heterocyclic ring which can contain further hetero-atoms;
R_{14} is hydrogen, halogen, alkoxy, aralkoxy, aryloxy, acyloxy, alkyl, aralkyl, aryl, nitro, CN, trifluoromethyl, carboxylic acid ester, carbonamide, N-substituted carbonamide, acyl, alkysulphonyl or arylsulphonyl or

K is



or



in which
R_9 is hydrogen, alkyl, alkoxy or halogen;
R_{10} is hydrogen, alkyl, aralkyl, cycloalkyl or aryl;
R_{11} is alkyl, aryl, carboxylic acid ester, carbonamide or substituted carbonamide;
R_{15} is hydrogen, alkyl, cycloalkyl or aralkyl;

R_{16} is hydrogen, alkyl, aralkyl, cycloalkyl or aryl; or R_{15} and R_{16}, together with the nitrogen atom, form a heterocyclic ring which can contain further hetero-atoms;
R_{17} is hydrogen, halogen, alkyl or alkoxy, and in which the aromatic carbocyclic rings of the dyestuff cation can be condensed with carbocyclic rings and additionally the substituents R_9, R_{14} and R_{17} can contan further non-ionic substituents;
with the proviso that at least one of the substituents R_9, R_{11}, R_{14} or R_{17} is a C_3-C_{13}-alkyl, C_3-C_{12}-alkoxy or C_5-C_6-cycloalkyl group or R_{10} is a C_3-C_{12}-alkyl or C_5-C_6-cycloalkyl group.

4,042,323

PROCESS OF INHIBITING CORROSION OF METAL IN AN AQUEOUS ENVIRONMENT WITH MIXTURES OF THIO-, OXYGEN AND THIO- OXYGEN PHOSPHATES AND PYROPHOSPHATES

Derek Redmore, Ballwin, and Alfred E. Woodson, Festus, both of Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Division of Ser. No. 272,626, July 17, 1972, Pat. No. 3,909,447. This application June 26, 1975, Ser. No. 590,517
Int. Cl.[2] C02B 5/06; C23F 11/16
U.S. Cl. 21—2.7 A **14 Claims**

1. A process of inhibiting corrosion of a metal in an aqueous environment consisting essentially of adding to such environment a corrosion inhibiting amount of a composition comprising a mixture of thiophosphate, pyrophosphate containing both oxygen and sulfur, and oxygen phosphate esters of alcohols selected from the group consisting of alkanols having at least seven carbon atoms and alcohols of the formula $R'(OA)_nOH$, where R' is alkyl, cycloalkyl, alkenyl, aryl, aralkyl, alkaryl or heterocyclic, A is an alkylene moiety and n is from 1 to 100, said pyrophosphate esters being the major part of the combined thiophosphate and pyrophosphate esters and the weight ratio of said combined esters to the oxygen phosphate esters being from about 10:1 to 1:10.

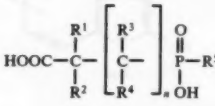
4,042,324

PROCESS FOR INHIBITING THE CORROSIONS AND DEPOSITION OF BOILER SCALE IN WATER-CONVEYiNG SYSTEMS

Theodor Auel; Hannsjorg Ulrich, both of Erftstadt; Horst-Dieter Wasel-Nielen, Hurth-Hermulheim, and Gero Heymer, Erftstadt, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Feb. 3, 1976, Ser. No. 654,885
Claims priority, application Germany, Feb. 8, 1975, 2505435
Int. Cl.[2] C02B 5/06; C23F 11/16
U.S. Cl. 21—2.7 A **2 Claims**

1. A process for inhibiting the phenomena of corrosion and deposition of boiler scale in water-conveying systems, which comprises admixing the water with at least one carboxy-alkane compound of phosphorus of the general formula:



in which each of the substituents R^1, R^2, R^3 and R^4 stands for hydrogen or an alkyl group having from 1 to 4 carbon atoms, R^5 stands for hydrogen, an OH—group or an alkyl group having from 1 to 3 carbon atoms, and n stands for 0 or 1, or with at least one water-soluble salt thereof.

4,042,325

METHOD OF KILLING MICROORGANISMS IN THE INSIDE OF A CONTAINER UTILIZING A PLASMA INITIATED BY A FOCUSED LASER BEAM AND SUSTAINED BY AN ELECTROMAGNETIC FIELD

Lowell G. Tensmeyer, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed June 21, 1976, Ser. No. 699,010
Int. Cl.[2] A61L 1/00
U.S. Cl. 21—54 R **17 Claims**

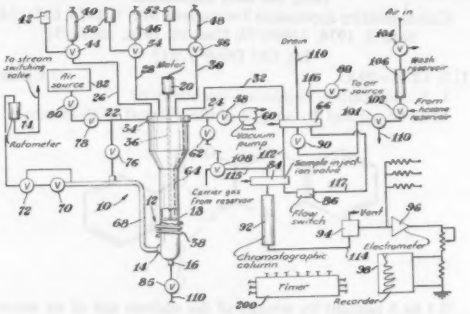
1. A method of killing microorganisms in the inside of a container comprising directing into the container an electromagnetic field having sufficient energy therein to sustain a plasma, focussing a high power laser beam at a focal point in the inside of the container, the focal point being at a sufficient distance from the inside surface of the container to avoid contacting the surface with the spark resulting from the convergence of the laser beam at the focal point thereof, pulsing the laser beam once and thereby initiating a plasma in the electromagnetic field, and sustaining the plasma for a sterilizing period with the energy in the electromagnetic field.

4,042,326

METHOD OF QUANTITATIVELY DETECTING CHLOROMETHYL METHYL ETHER AND/OR BIS-CHLOROMETHYL ETHER WITH IMPROVED SENSITIVITY

George J. Kallos, Saginaw, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 536,709, Dec. 26, 1974, abandoned. This application Sept. 10, 1975, Ser. No. 611,939
Int. Cl.[2] G01N 31/08
U.S. Cl. 23—230 R **26 Claims**



1. The improved method of quantitatively determining the presence of chloromethyl methyl ether or bis-chloromethyl ether in a fluid which comprises:
bringing a sample of said fluid into intimate admixture, in lower alcohol medium, with an alkali metal salt of a lower alcohol and with a readily detectable organic hydroxy compound selected from
1. a compound of the formula R-OH wherein R is a halo-lower alkyl, a halophenyl, unsubstituted phenyl, an alkoxy halophenyl, an alkoxy phenyl, an alkyl halophenyl, an alkylphenyl or
2. a halothiophenol or thiophenol or
3. a halopyridinol or unsubstituted pyridinol, the molar ratio of said salt to said hydroxy compound being in the range of from about 0.2:1 to about 5:1, the total moles of said salt present in said lower alcohol medium being at least equal to the sum of the moles of chloromethyl methyl ether plus two times the moles of bis-chloromethyl ether present, and the total moles of said hydroxy compound present in said lower alcohol medium being at least equal to the sum of the moles of chloromethyl methyl ether and bis-chloromethyl ether present;
adding to the admixture, (1) an aqueous medium selected from the group consisting of (a) water and (b) an aqueous

solution of a salt former, and (2) an immiscible organic solvent;

agitating the admixture and allowing the phases to separate;

drawing off at least a portion of the solvent phase containing ether derivative;

directing said solvent portion onto a suitable gas chromatographic column;

eluting with inert gas the solvent portion from the column and into an electron capture detector capable of detecting the said ether derivative;

and displaying the output of said detector on a readout device.

4,042,327

ION-PAIRING CHROMATOGRAPHY

William G. Haney, Shawnee Mission, Kans., and Douglas P. Wittmer, Milford, Mass., assignors to Waters Associates, Inc., Milford, Mass.

Filed Jan. 15, 1976, Ser. No. 649,365
Int. Cl.[2] G01N *31/08*
U.S. Cl. 23—230 R **17 Claims**

1. In liquid chromatographic processing of compositions containing ionizable compounds, wherein the sample to be processed is carried in a mobile liquid phase which is passed through a porous packing material, in intimate physical contact therewith, and wherein said packing material has a chemical group chemically bonded onto the surface of said packing, the improvement comprising the steps of:

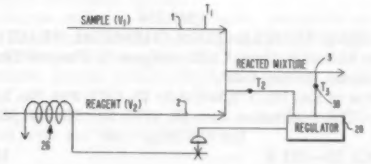
1. dissolving a counter ion, to a characterizing radical of at least one of said ionizable compounds, in a polar mobile liquid;
2. forming a reversible complex between said counter ion and at least one said characterizing radical, said complex being soluble in said polar liquid;
3. passing said complex through said packing for a time sufficient that chemical attraction between said complex and chemically-bonded group causes substantial retardation of the complex through the column; and
4. analyzing the effluent of said column.

4,042,328

ON-LINE ANALYZER

George W. Seymour, 2841 Parkwood Drive, Brunswick, Ga. 31520

Filed Apr. 6, 1976, Ser. No. 674,261
Int. Cl.[2] D21C *7/12*; G01N *25/48*
U.S. Cl. 23—230 R **7 Claims**



1. A process for continuously determining the concentration of at least one chemical substance in a moving fluid sample stream which comprises:

mixing an excess of a reagent stream with said fluid sample stream to form a final reacted mixture stream, said reagent stream being reactive with said chemical substance to produce either an exothermic or endothermic reaction;

regulating the temperature of said reagent stream so that the temperature of the final reacted mixture stream approximates the temperature of the reagent stream, or regulating the temperature of the sample so that the temperature of the final reacted mixture stream approximates the temperature of the reagent stream; and then

determining the concentration of the chemical substance in accordance with the following equation:

$$X = \frac{V_1(T_3 - T_1) + V_2(T_3 - T_2)}{C\,V_1}$$

where

X is said concentration of at least one chemical substance, in said sample stream;

T_1, T_2 and T_3 represent the temperatures of said sample stream, reagent stream and final reacted mixture stream, respectively;

V_1 represents the flow rate of said sample stream;

V_2 represents the flow rate of said reagent stream; and

C is a factor which equals

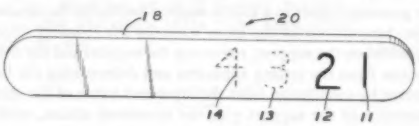
$$\frac{(\Delta H_{Reaction})\ (\text{heat capacity of the sample stream})}{\text{molecular weight of the chemical substance being determined.}} \times \%\ \text{completion}$$

4,042,329

METHOD AND DEVICE FOR DETECTING CHOLESTEROL

Harry T. Hochstrasser, Hastings-on-Hudson, N.Y., assignor to Becton, Dickinson and Company, Rutherford, N.J.

Continuation-in-part of Ser. No. 533,972, Dec. 18, 1974, Pat. No. 3,964,871. This application Apr. 14, 1976, Ser. No. 676,662
The portion of the term of this patent subsequent to June 22, 1993, has been disclaimed.
Int. Cl.[2] G01N *33/16*
U.S. Cl. 23—230 B **14 Claims**



9. A method of determining the concentration of cholesterol in a biological solution which comprises;

immersing in said solution an indicator which comprises;

a support member; and

a plurality of indicating reagents for said cholesterol, each of which is located in a separate zone of said member and at least two of which indicate the presence of a different concentration of said cholesterol in solution;

removing said indicator from said solution; and observing the indicia registered.

4,042,330

IN A METHOD FOR CHECKING THE ACCURACY OF A TEST USING AN ENZYMATICALLY HYDROLYZABLE, SERUM-SOLUBLE CHOLESTEROL COMPOUND

Arvind D. Deshmukh, 1011 Pearl St., Santa Monica, Calif. 90405

Filed Aug. 23, 1976, Ser. No. 716,616
Int. Cl.[2] G01N *33/16*
U.S. Cl. 23—230 B **9 Claims**

1. In a method for checking the accuracy of a test for the quantitative determination of the cholesterol content of a biological fluid wherein said test is conducted on a standard comprising a solution in said biological fluid of a known quantity of a serum-soluble cholesterol compound, the improvement in accordance with which said cholesterol compound is at least one ester of cholesterol reactively combined with a solubilizing agent selected from the group consisting of peptides, proteins, water-soluble polycarboxylic acids, organic and inorganic water-soluble salts of said polycarboxylic acids, and cis-vicinal water-soluble polysaccharides, said ester of choles-

terol being selected from the (a) esters of an acid having at least six carbon atoms in its longest chain, and (b) amino esters.

4,042,331

PROCESS FOR THE DETERMINATION OF THE BORON CONTENTS OF PURE HALOGENSILANES

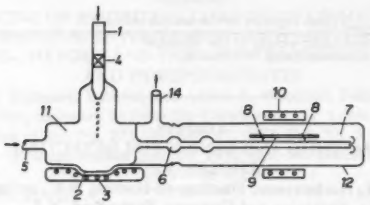
Dietrich Schmidt, Burghausen; Johann Hofer, Kirchdorf; Winfried Lang, Burghausen, and Erich Bildl, Holzoster, all of Austria, assignors to Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH, Burghausen, Germany

Filed Nov. 1, 1976, Ser. No. 737,307

Claims priority, application Germany, Dec. 23, 1975, 2558183

Int. Cl.² G01N *31/12*

U.S. Cl. 23—230 PC **8 Claims**



1. A process for the determination of the boron content of pure halogen-silanes which contain up to 0.1% of atoms of acceptors and donors, which comprises the steps of converting the halogen silanes into the gaseous state in a testing apparatus by contacting said halogensilanes with an evaporator surface heated to a temperature ranging from 80°C to 350°C, passing the generated gases to a silicon support heated to the decomposition temperature of the gases whereby the released silicon is deposited on the support, removing the support and the deposit thereon from the testing apparatus and determining the boron content by calculation from the measured value of the specific resistance of the support plus the deposited silicon, with the proviso that all parts of the testing apparatus which come into contact with the gas should be at a temperature above 80°C, but below the decomposition temperature of the halogensilane, with the exception of the support heated to the required deposition temperature.

4,042,332

SEPARATION METHOD OF METHANE FROM OTHER HYDROCARBONS THAN METHANE

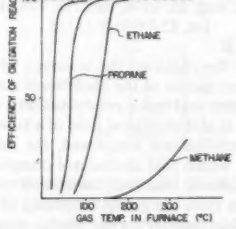
Osamu Saitoh; Masakatu Imaki, both of Kyoto, and Hazime Asami, Higashiosaka, all of Japan, assignors to Horiba, Ltd., Japan

Filed Feb. 10, 1976, Ser. No. 643,952

Claims priority, application Japan, Dec. 23, 1974, 49-50178

Int. Cl.² G01N *31/10, 31/12;* B01D *53/16*

U.S. Cl. 23—232 R **7 Claims**



1. A method for the separation of methane from a gaseous mixture containing methane and at least one of ethane and propane which comprises

a. simultaneously passing said gaseous mixture and oxygen over a catalyst comprising platinum on an active carbon carrier;

b. selectively oxidizing the ethane and propane in said gaseous mixture at a temperature of about 170° C and

c. recovering methane from said mixture.

4,042,333

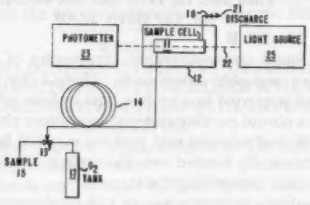
APPARATUS AND METHOD FOR GAS ANALYSIS

Curtis G. Dell, and James A. Williamson, Jr., both of Newark, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 448,690, March 6, 1974, abandoned. This application Feb. 11, 1976, Ser. No. 657,046

Int. Cl.² G01N *1/22, 21/24*

U.S. Cl. 23—232 R **8 Claims**



1. A method for analyzing a sample gas, comprising the steps of:

a. introducing the sample gas into a high pressure sample cell through a long narrow holding tube having a volume greater than the volume of the sample cell;

b. adjusting the pressure of the sample gas in the sample cell and the holding tube to a known value;

c. closing off the sample cell at the end opposite the holding tube;

d. introducing a second gas, which will not interfere with the analysis, into the holding tube, behind the sample gas, at a pressure sufficient to force all of the sample gas contained in the holding tube into the sample cell adding to the sample gas originally contained in the sample cell so that the pressure of the sample gas in the sample cell is increased; and

e. detecting the presence of at least one component of the sample gas.

4,042,334

HIGH TEMPERATURE CHEMICAL REACTOR

Edwin Matovich, Brea, Calif., assignor to Thagard Technology Company, Irvine, Calif.

Division of Ser. No. 271,560, July 13, 1972, Pat. No. 3,933,434. This application June 30, 1975, Ser. No. 591,950

Int. Cl.² B01J *1/00*

U.S. Cl. 23—252 R **18 Claims**

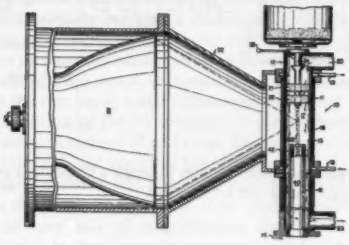
1. A high temperature reactor wherein substantially all of the heat is supplied by radiation coupling comprising:

a. a reactor tube having an inlet end and an outlet end, the interior of the tube defining a reactor chamber, the reactor tube being made of a material which is substantially transparent to radiation and including an inner wall and an outer wall which define an annular channel therebetween throughout which a fluid medium which is substantially transparent to radiation can be circulated to cool the reactor tube;

b. a diffuser disposed adjacent the inlet end of the reactor tube through which an inert gas which is substantially transparent to radiation is directed under pressure, and thereafter in substantially laminar flow axially through the

reactor chamber to provide a protective blanket for the inner wall of the reactor tube;

c. means for introducing at least one reactant into the reactor chamber through the inlet end of the reactor tube in a predetermined path axially of the reactor tube, the reactants being confined substantially centrally within the reactor chamber and out of contact with the inner wall of the reactor tube by the protective blanket; and



d. a radiant energy source located externally of the outer wall of the reactor tube and disposed within a reflector, the reflector being configured and positioned to focus radiant energy generated by the source to at least a portion of the predetermined path of the reactants within the reactor chamber.

4,042,335

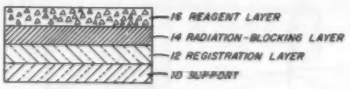
INTEGRAL ELEMENT FOR ANALYSIS OF LIQUIDS

Pierre L. Clément, Paris, France, assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 598,462, July 23, 1975, abandoned. This application June 25, 1976, Ser. No. 691,265

Int. Cl.² G01N *31/22*

U.S. Cl. 23—253 TP **20 Claims**



1. An integral element for analysis of liquids, the element comprising,

a reagent layer comprising a composition that is interactive in the presence of a predetermined analyte to provide a diffusible, detectable species,

a non-fibrous radiation-blocking layer, permeable to the detectable species and comprising an opacifying agent,

a radiation-transmissive registration layer, permeable to the detectable species, within which said species can be detected and comprising a non-fibrous material,

wherein the radiation-blocking layer is interposed between the registration layer and the reagent layer.

4,042,336

TIME TEMPERATURE INTEGRATING INDICATOR

Raymond P. Larsson, Denville, N.J., assignor to Bio-Medical Sciences Inc., Fairfield, N.J.

Continuation-in-part of Ser. No. 469,851, May 14, 1974, Pat. No. 3,946,611. This application Sept. 22, 1975, Ser. No. 615,300

The portion of the term of this patent subsequent to Jan. 13, 1993, has been disclaimed.

Int. Cl.² G01N *21/06*

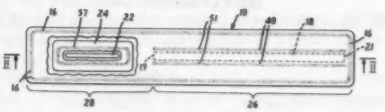
U.S. Cl. 23—253 TP **11 Claims**

1. A temperature time integrating indicator device which comprises:

a. an elongated envelope having generally co-extensive upper and lower walls each of a gas impermeable material, the walls being sealed together in a continuous course extending about the periphery of each, a first longitudinal portion of said envelope comprising a gas generation section within said envelope and a second longitudinal portion of said envelope comprising an indicating section within said envelope;

b. a gas generating material disposed in the gas generation section of said envelope;

c. an elongated wick disposed longitudinally of the envelope with one end thereof in said gas generation section, said



wick extending a distance along said envelope indicating section and the other end thereof being remote from said gas generating section;

d. a rate controlling film separating said wick from the gas generating material;

e. an indicator composition deposited on said wick, said indicator composition producing a color change in the presence of gas generated by said gas generating material; and

f. a quantifier incorporated into the indicator composition.

4,042,337

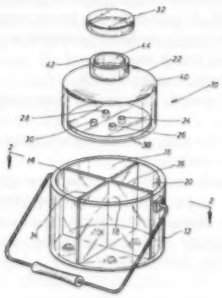
URINE COLLECTION DEVICE

Donald P. Griffith, 1200 Moursund, Houston, Tex. 77025

Filed Feb. 17, 1977, Ser. No. 769,693

Int. Cl.² G01N *33/16, 1/10*; **A61B** *10/00*

U.S. Cl. 23—259 **1 Claim**



1. A urine collection device comprising:

a receptacle for holding liquid urine having a bottom and sides,

said receptacle being divided into separate, noncommunicating bins defined by walls extending from the bottom to the upper edge of the sides, one or more of said bins containing a chemical compound for effecting desired characteristics in urine introduced into the respective receptacle bins; and

a manifold for attachment atop the sides of said receptacle, said manifold including a base plate having at least one opening formed therein for each bin of said receptacle, with each of said openings being positioned to register with a respective one of said bins when said manifold is placed on said receptacle, and

an upper cover disposed a distance away from said base plate at its center and attached at its periphery to said base plate, said upper cover and said base plate in combination forming a chamber, and

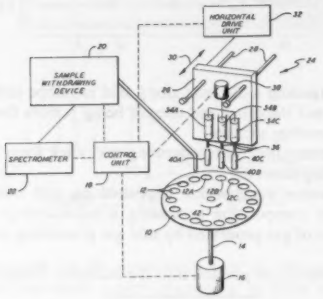
a closeable inlet in the upper end of said manifold communicating with the chamber formed therein for introducing liquid urine into said chamber.

4,042,338

AUTOMATIC SAMPLE PREPARATION DEVICE

Bernhard Werner Huber, Uberlingen, Germany, assignor to Bodenseewerk Perkin-Elmer & Co. GmbH, Uberlingen, Germany

Filed July 30, 1976, Ser. No. 710,015
Claims priority, application Germany, Sept. 13, 1975, 2540969
Int. Cl.² G01N *1/14*
U.S. Cl. 23—259 **18 Claims**



1. An automatic sample preparation device for use in flameless atomic absorption spectroscopy or the like, wherein samples to be examined for a particular element are successively mixed with graduated, metered additions of the element to be determined, comprising, in combination:

controlled delivery pump means,

storage vessel means containing dilution agents connected to the inlet side of said delivery pump means,

a plurality of dosing probes connected to the outlet side of said delivery pump means,

stepwise movable carrier means,

a plurality of sample containers mountable on said carrier means,

a sample withdrawing device for withdrawing samples from said sample containers,

means for jointly moving said dosing probes with respect to said carrier means so that one group of at least two successive sample containers on said carrier means can be simultaneously mixed with graduated, metered additions of the element to be determined prior to sample withdrawal.

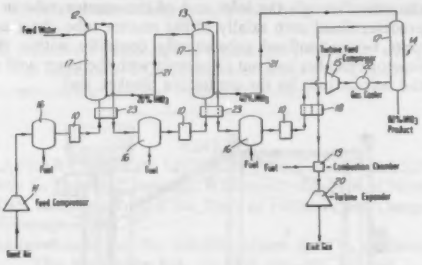
4,042,339

PRODUCTION OF NITRIC ACID

Geoffrey Gordon Haselden, and Douglas Handley, both of Leeds, England, assignors to University of Leeds Industrial Services Limited, England

Filed May 9, 1975, Ser. No. 576,123
Claims priority, application United Kingdom, May 20, 1974, 22448/74
Int. Cl.² B01J *7/00*; C01B *21/40*; F23L *15/02*; F28D *17/02*
U.S. Cl. 23—262 **9 Claims**

1. A reactor to be operated at superatmospheric pressure and on the regenerative principle with flow reversal comprising a stationary steel pressure vessel capable of withstanding an internal pressure of a plurality of atmospheres, a stationary refractory gas-permeable regenerator wall enclosed by said pressure vessel and in turn surrounding a cylindrical furnace chamber, burner means for introducing and burning fuel in said furnace chamber, a stationary gas-impermeable dividing wall dividing said cylindrical furnace chamber into sections, said dividing wall having a gap for intercommunication between the sections of said furnace chamber, and a respective gas inlet/outlet in the pressure vessel wall communicating with



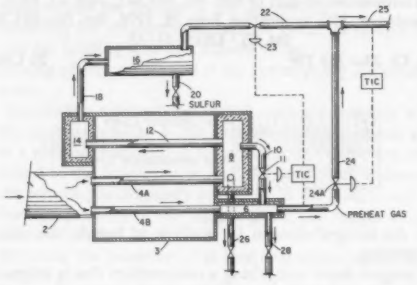
each furnace chamber section through a respective portion of the gas-permeable refractory wall.

4,042,340

APPARATUS FOR USING REHEAT GAS IN SULFUR RECOVERY SYSTEMS

John W. Palm, Tulsa, Okla., assignor to Amoco Production Company, Tulsa, Okla.

Continuation of Ser. No. 467,348, May 6, 1974, abandoned, which is a division of Ser. No. 277,421, Aug. 2, 1972, Pat. No. 3,833,716. This application Nov. 17, 1975, Ser. No. 632,325
Int. Cl.² B01J *1/00*; F22B *7/12*
U.S. Cl. 23—262 **5 Claims**



1. An apparatus for use in the production of sulfur from H_2S-containing acid gases by first converting said H_2S into a mixture of approximately one-third SO_2 and two-thirds H_2S, said apparatus comprising the combination of an elongated metal vessel closed at both ends, a first, second and third series of generally parallel tubes defining a heat exchange section in said vessel, first and second chambers exterior of said vessel and affixed to one of said ends, a third chamber exterior of said vessel affixed to the other of said ends, one end of said first and second series of tubes communicating with said first and second chambers, respectively, means for supplying said mixture to the other end of said first and second series of tubes, said third series of tubes communicating with both said second and third chambers, valve means for withdrawing and controlling the flow of a gas stream from said second chamber and mixing said stream with the contents of said first chamber, the control of said flow from said second chamber to said first chamber varying inversely with the flow rate of said mixture, a first conduit means for withdrawing and controlling the flow of a gas stream from said first chamber, and a second conduit means communicating with said third chamber and with said first conduit means.

4,042,341

MAGNETIC FILMS OF TRANSITION METAL-RARE EARTH ALLOYS

John G. Smeggil, Elnora, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 406,310, Oct. 15, 1973, abandoned. This application Oct. 10, 1975, Ser. No. 621,639

Int. Cl.[2] B32B *15/04, 9/04*

U.S. Cl. 428—678 6 Claims

1. A magnetic member consisting essentially of a non-magnetic solid substrate carrying a magnetically anisotropic film consisting of a transition metal-rare earth alloy, wherein the transition metal component is selected from the group consisting of cobalt, iron, nickel, manganese and alloys thereof, and wherein the rare earth metal component is selected from the group consisting of the 15 elements of the lanthanide series having atomic numbers 57 to 71 and the element yttrium and mixtures thereof, said alloy flim being continuous coherent and substantially uniform, said alloy film having a thickness ranging from about 100 Angstroms to about 10,000 Angstroms and having an easy axis of magnetization significantly aligned perpendicular to the plane of the substrate, and said substrate being substantially inert only at temperatures ranging up to 1000° C.

5. A magnetic member according to claim 1 wherein said alloy film has a coating of an inert non-magnetic material which prevents oxidation and deterioration of the magnetic properties of the alloy film.

4,042,342

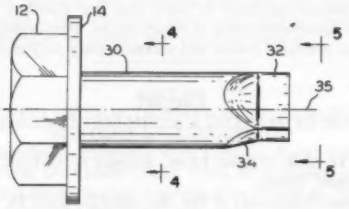
BLANKS FOR MAKING SELF-THREAD FORMING THREADED FASTENERS

Herman G. Muenchinger, 459 Mount Pleasant St., New Bedford, Mass. 02742

Division of Ser. No. 432,957, Jan. 14, 1974, Pat. No. 3,978,760, which is a continuation-in-part of Ser. No. 3,985, Jan. 19, 1970, Pat. No. 3,681,963, and Ser. No. 253,974, May 17, 1972, Pat. No. 3,803,889. This application June 15, 1976, Ser. No. 696,477

Int. Cl.[2] B21H *3/00;* F16B *35/00*

U.S. Cl. 428—585 3 Claims



1. A blank for making a thread-forming screw fastener comprising a cylindrical shank portion, a head at one end of the shank, a cylindrical lead portion at the other end of the shank having a diameter smaller than the diameter of the shank portion, and an intermediate portion diverging from the lead portion to the shank portion in a substantially conical configuration, the axis of a cone circumscribing the intermediate portion being offset from and parallel with the axis of the lead portion whereby the intermediate portion and the lead portion are eccentric relative to one another to provide a lobe on a portion of the periphery of the intermediate portion, the intermediate portion and the lead portion intersecting along a line which extends at an acute angle with respect to the axis of the lead portion whereby all planes transverse to the axis of the lead portion and extending through said line intersect both the lead portion and the intermediate portion.

4,042,343

FIRE LOG PROCESS AND APPARATUS

Brian C. Bernard, Oakland, Calif., assignor to The Clorox Company, Oakland, Calif.

Filed Sept. 26, 1975, Ser. No. 616,950

Int. Cl.[2] C10L *5/00, 5/22*

U.S. Cl. 44—10 B 16 Claims

1. A process for continuously producing fire logs comprising the steps of:

providing a combustible starting ingredient in the form of sawdust,

providing a binder in the form of wax,

heat said wax binder to a liquid state,

mixing said combustible starting ingredient in the form of said wax binder with said sawdust in a mixer to produce a hot mixture,

cooling said hot mixture in a cooler to produce a cool mixture at substantially ambient temperature suitable for forming, and forming said cool mixture into a log shape, wherein the step of cooling the hot mixture of sawdust and hot wax to substantially ambient temperature comprises,

continuously adding said hot mixture at a first temperature to a cooler,

continuously adding inlet air at a temperature lower than that of said hot air mixture to said cooler so that it is in intimate contact with said hot mixture, so as to transfer heat from said hot mixture to said inlet air, and

exhausting the inlet air from said cooler as exhaust air at a temperature higher than the temperature of said inlet air.

10. A cooler for cooling a hot product comprising a generally elongated hollow body defining a pair of side walls, a pair of end walls, top and bottom walls, and further defining inlet and outlet ends, means defining an air inlet opening in said inlet end, means defining an air outlet opening adjacent said outlet end, means defining a hot product opening adjacent said inlet end, means defining a cool product opening in said outlet end, means defining a cool product opening adjacent said outlet end, a conveyor means within said body for conveying said product from said hot product opening to said cool product opening whereby air flow from said air inlet opening to said air outlet opening cools the hot product entering said hot product opening so that a cool product is discharged from said cool product opening wherein said conveyor means comprises a first conveyor in the form of a plurality of spaced, generally parallel rollers rotatably mounted on said side walls intermediate and spaced from said top and bottom walls and motor means for driving said rollers, and wherein said conveyor means further comprises a second conveyor intermediate said first conveyor and said bottom wall, said second conveyor being spaced from said first conveyor, and motor means for driving said second conveyor, whereby product passing between said rollers of said first conveyor falls onto said second conveyor for subsequent transfer to said cool product opening.

4,042,344

PROCESS FOR THE PRODUCTION OF GASEOUS MIXTURES

Thomas George Callcott, Mayfield, and Terrence Kevin Deague, Kotara, both of Australia, assignors to The Broken Hill proprietary Company Limited, Victoria, Australia

Filed May 7, 1976, Ser. No. 684,003

Claims priority, application Australia, May 9, 1975, 1532/75

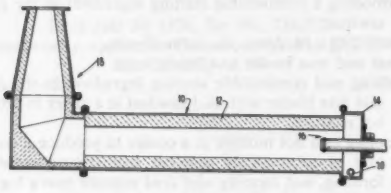
Int. Cl.[2] C10J *1/12*

U.S. Cl. 48—197 R 9 Claims

1. A process for the production of a gaseous mixture containing substantial amounts of carbon monoxide and hydrogen, comprising the steps of:

1. blending an oxidizing gas and a primary fuel within a combustion chamber having a combustion zone, said combustion chamber being substantially free of baffles in said combustion zone, to produce a compressible gas or gas-like mixture,

2.causing said mixture to assume a highly turbulent compact and self-contained configuration, provided that, however, when said self-contained configuration is achieved by causing the mixture to swirl, then the swirl number is greater than 0.5 and no greater than about 1.5, and igniting said mixture when in said configuration to achieve total combustion of said primary fuel to produce hot gaseous products, and



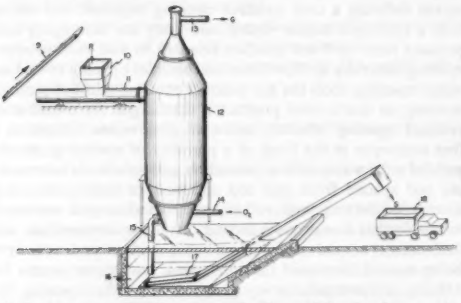
3. thereafter mixing and reacting the hot gaseous products of said combustion process with a gas-like secondary fuel in said combustion chamber, wherein the secondary fuel is introduced into said combustion chamber adjacent to the wall thereof and in physical contact with said self-contained configuration, to produce a gaeous mixture containing substantial amounts of CO and H_2.

4,042,345

PROCESS FOR CONVERSION OF SOLID REFUSE TO FUEL GAS USING PELLETIZED REFUSE FEED

John Erling Anderson, Katonah, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed Apr. 12, 1976, Ser. No. 675,935
Int. Cl.[2] C10J *3/00*
U.S. Cl. 48—209 **5 Claims**



1. In a process for disposing of refuse while simultaneously producing a useful gaseous product and an inert solid residue, comprising the steps of (a) feeding refuse into the top portion of a vertical shaft furnace and forming a bed of said refuse within the furnace, (b) feeding an oxygen containing gas into the base of said furnace, (c) pyrolysing the organic portion of the refuse, (d) fluidizing the inorganic portion of the refuse, (e) discharging the gaseous products from the top of said furnace, and (f) tapping the fluidized inorganic material from the base of said furnace, the improvement comprising:

feeding the refuse into the furnace in the form of pellets of compacted refuse, said pellets being of sufficient structural strength to remain coherent at least within the drying and pyrolysis zones of the furnace, in order to inhibit channeling and to provide a porous structure throughout the height of the refuse bed, said pellets having:

1. a density greater than that given by the equation:

$$D = 2{,}000/(100 - 0.8A)$$

where:

D = the density of the pellet (lbs./ft.^{3}), and

A = percent inorganics in the refuse pellet, and

2. a surface to volume ratio greater than that given by the equation:

$$R = 15(G/H)^{0.625}$$

where:

R = the ratio of the surface area to the volume of the pellet (ft.^{2}/ft.^{3})

H = the height of the refuse bed in the furnace (ft.)

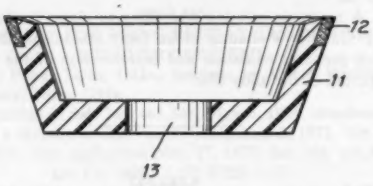
G = the refuse feed rate (tons/day/ft.^{2} of furnace cross-sectional area).

4,042,346

DIAMOND OR CUBIC BORON NITRIDE GRINDING WHEEL WITH RESIN CORE

Richard H. Sioui, Holden, and Edgar B. Carver, South Sutton, both of Mass., assignors to Norton Company, Worcester, Mass.

Filed Dec. 24, 1975, Ser. No. 644,161
Int. Cl.[2] C09K *3/14*
U.S. Cl. 51—298 A **3 Claims**



1. In a grinding wheel comprising a grinding section including an abrasive selected from the group consisting of diamond and cubic boron nitride, said grinding section being bonded to the outer periphery of a non-abrasive core, the improvement comprising the core having a composition consisting essentially of from 5 to 20% by volume of a resin selected from the group consisting of phenol aldehyde, urea aldehyde, and melamine aldehyde resins, from 0 to 90% by volume of fillers selected from the group consisting of aluminum powder, copper powder, and graphite, and from 5 to 80% by volume of cured reaction products of resin molding powders selected from the group consisting of epoxy resins, unsaturated polyester resins, urethane resins, and thermosetting polyimide resins.

4,042,347

METHOD OF MAKING A RESIN-METAL COMPOSITE GRINDING WHEEL

Richard H. Sioui, Holden, Mass., assignor to Norton Company, Worcester, Mass.

Continuation-in-part of Ser. No. 460,827, April 15, 1974, abandoned. This application Jan. 23, 1976, Ser. No. 651,792
Int. Cl.[2] C09K *3/14*
U.S. Cl. 51—298 R **6 Claims**

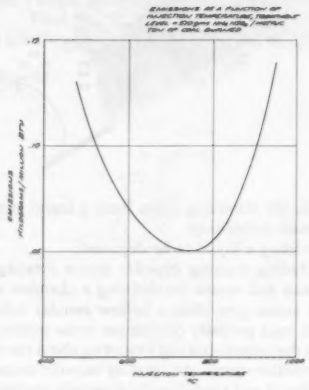
1. A method of making grinding wheels containing premium abrasives selected from the group consisting of diamond and abrasive boron nitride having a bond matrix consisting of two interlocked continuous phases, one of metal and one of an organic polymer which remains solid at 250° C and below, said metal matrix consisting of a least two metals at least one selected from the group consisting of tin, bismuth, and indium and at least one selected from the group consisting of iron, cobalt, tantalum, manganese, nickel, titanium, silver, and copper and including a phase melting above 250° C, comprising mixing powdered metal, including at least one metal melting below the temperature stability limit of the resin, with abrasive grits, and with an organic resin or resin precursor in powdered form, subjecting such mixture to heat and pressure in a mold such that the metal and resin individually coalesce to form

continuous separate interlocked phases throughout which the abrasive particles are uniformly distributed.

4,042,348
METHOD OF CONDITIONING FLUE GAS TO ELECTROSTATIC PRECIPITATOR

Robert P. Bennett, Bridgewater; Matthew J. O'Connor, Flanders; Alfred E. Kober, Hopatcong, and Ira Kukin, West Orange, all of N.J., assignors to Apollo Chemical Corporation, Whippany, N.J.

Filed Aug. 2, 1976, Ser. No. 710,582
Int. Cl.[2] B03C *1/00*
U.S. Cl. 55—5 **28 Claims**



1. A method of improving the collection characteristics of particles entrained in a stream of particle-laden gas formed by the burning of coal for collection by an electrostatic precipitator, comprising forming a mixture of

A. the particle-laden gas at a temperature of 590°–900° C., and

B. finely divided ammonium sulfate; said mixture containing 75–1250 grams of ammonium sulfate per metric ton of coal burned to form said gas, and

C. after forming said mixture, directing said gas stream through a heat exchange means and into an electrostatic precipitator to collect said particles therein.

4,042,349
METHOD OF FRACTIONATION OF A GASEOUS MIXTURE BY ADSORPTION

Yvonne Baudouin, Palaiseau; Guy Simonet, Paris; Robert Eluard, Paris, and Claude Pivard, Paris, all of France, assignors to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

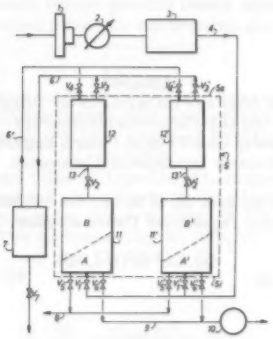
Filed Oct. 18, 1972, Ser. No. 298,774
Int. Cl.[2] B01D *53/04*
U.S. Cl. 55—25 **16 Claims**

1. A method of fractionation of a gaseous mixture by adsorption, utilizing at least one adsorption line including in an adsorption direction at least a first adsorber and a second adsorber, each adsorber comprising at least one adsorbent mass which preferentially adsorbs at least one constituent of said gaseous mixture, said method comprising at least one adsorption cycle carried out with at least one adsorption line, said adsorption cycle comprising successively:

1. in a constant-pressure extraction stage, introducing said gaseous mixture successively into the inlet of said adsorption line in which it circulates in said first adsorber in the adsorption direction under a first pressure and then is expanded between said first adsorber and said second adsorber down to a second lower pressure and then circulates in said second adsorber still in the adsorption direction under said second pressure, and withdrawing a gaseous fraction impoverished in at least said one constituent from the outlet of said adsorption line, under a constant pressure,
2. in a stage of pressure reduction during which the outlet of said adsorption line is closed and the inlet of said second adsorber is in fluid communication with the outlet of said first adsorber, withdrawing from the inlet of said adsorption line, countercurrently to the adsorption direction, at least one gaseous fraction enriched in at least said one constituent, while reducing the pressure in said first and second adsorbers down to a low pressure lower than said second pressure,
3. in a pressure-increase stage, increasing the pressure existing in said first adsorber and said second adsorber from said low pressure up to the first pressure and up to the second pressure respectively.

16. A method of fractionation of a gaseous mixture by adsorption, utilizing at least two adsorption lines, each line including at least one adsorber comprising at least one adsorbent mass which preferentially adsorbs at least one constituent of the gaseous mixture, said method comprising at least one adsorption cycle carried out with at least one adsorption line, said adsorption cycle comprising successively:

1. in a constant-pressure extraction stage, introducing said gaseous mixture into the inlet of said adsorption line, under a high pressure, in an adsorption direction, and



withdrawing a gaseous fraction impoverished in at least said one constituent from the outlet of said adsorption line, in said adsorption direction, under a constant pressure,

2. in a regeneration stage comprising:

2.1. in a balancing period, withdrawing at least a gaseous fraction from the outlet of said adsorber, in said adsorption direction, while reducing at least the pressure existing in said adsorber from a pressure at most equal to the high pressure down to an intermediate pressure,

2.2. in a period of pressure reduction during which the outlet of said adsorption line is closed, withdrawing from the inlet of said adsorption line, countercurrently to the adsorption direction, at least one gaseous fraction enriched in at least said one constituent, while reducing at least the pressure existing in said adsorber, from said intermediate pressure down to a low pressure,

3. in a pressure-increase stage including successively:

3.1. in another balancing period carried out during at least part of the balancing period of the regeneration stage of the other adsorption line, introducing into at least the inlet of said adsorber, in the adsorption direction, a gaseous fraction withdrawn also in said adsorption direction from at least the outlet of a corresponding other adsorber in said adsorption direction of the other adsorption line, while increasing at least the pressure in said adsorber up to another intermediate pressure,

3.2. in a front-rise period, introducing a gaseous fraction impoverished in at least said one constituent into at least

the outlet of said adsorber, countercurrently to the adsorption direction, while increasing at least the pressure existing in said adsorber from said another intermediate pressure up to a final pressure lower than said high pressure,

3.3. in an inflation period, introducing said gaseous mixture into at least the inlet of said adsorber, in the adsorption direction, while increasing at least the pressure existing in said adsorber from said final pressure, up to a pressure at most equal to said high pressure,

each adsorption line comprising, in the direction of adsorption, at least one first adsorber and one second adsorber, said another balancing period of the pressure-increase stage comprising:

in a first balancing period, placing the inlet of the first adsorber into communication with the outlet of the corresponding other first adsorber of the other adsorption line,

in a second balancing period, placing the inlet of the second adsorber into communication with the outlet of the corresponding other second adsorber of the other adsorption line.

4,042,350

METHODS AND APPLICATIONS OF PREPARATIVE SCALE CHROMATOGRAPHY

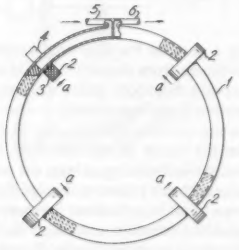
Courtenay Stanley Goss Phillips, Oxford, England, assignor to National Research Development Corporation, London, England

Filed June 20, 1975, Ser. No. 588,908

Claims priority, application United Kingdom, July 3, 1974, 29491/74

Int. Cl.[2] B01D *15/08*

U.S. Cl. 55—28 **10 Claims**



1. A chromatographic method for fractionating a mixture of sorbate components in a continuous operation comprising:

providing a flow path of sorbent having different affinities for the sorbate components of said mixture;

feeding said mixture into said flow path of sorbent; and

thermally displacing a sorbate through said sorbent in advance of a substantially uniform heat zone of limited width to fractionate said sorbate components into an abutting succession of components in accordance with the affinities of said components for said sorbent by relative movement between the sorbent and the heat zone, the mixture being fractionated into sorbate components in the advancing relatively cool area of sorbent ahead of said heat zone, the amount of all sorbate components falling into said heat zone being relatively insignificant.

4,042,351

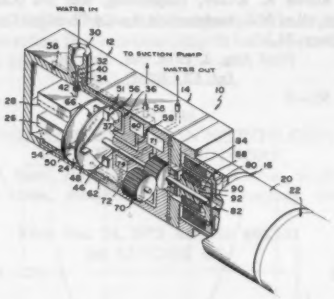
LIQUID DEGASIFIER SYSTEM AND METHOD

Robert L. Anderson, Boulder, Colo., assignor to Halbert (NMI) Fischel, Encino, Calif.

Filed Jan. 28, 1976, Ser. No. 653,229

Int. Cl.[2] B01D *19/00*

U.S. Cl. 55—52 **23 Claims**



1. A system for removing gases from a liquid stream on a continuous basis comprising:

means providing a liquid to be degassed;

means, including rotating impeller means rotating about a central axis and means for defining a chamber about the impeller means providing a hollow annular volume having an at least partially curvilinear cross section concentric with the central axis and extending about the periphery of the impeller means, the rotating impeller means receiving the liquid and centrifugally directing the liquid into a helical liquid flow with interior cavitation within the hollow annular volume as well as along the outer periphery, as the impeller means rotates;

settling chamber means coupled to receive liquid from the periphery of the hollow annular flow at a bottom region thereof;

means coupled to said settling chamber means and to said chamber about the impeller means for maintaining low gas pressures therein to remove gases from both of said means; and

means coupled to said settling chamber means for extracting liquid therefrom.

3. The method of continually degasifying a liquid comprising the steps of:

centrifugally inducing a toroidal vortex flow pattern about and along an axis circumferential to a central axis with internal cavitation at the circumferential axis while drawing a suction interior to the toroidal flow to provide a first extraction of gases;

withdrawing liquid from the periphery of the toroidal flow;

storing a volume of the withdrawn liquid;

drawing off entrapped gases from the withdrawn liquid under suction to provide a second extraction of gases; and

removing the degasified liquid from the volume under suction.

4,042,352

METHOD FOR THE REMOVAL OF THE DUSTS FROM COMBUSTION EXHAUST GASES

Shujiro Shiga, Chiba; Takeshi Katsumata, Ichihara; Yasushi Okamoto, Ichihara, and Takashi Nakata, Ichihara, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Apr. 22, 1976, Ser. No. 679,447

Claims priority, application Japan, Apr. 22, 1975, 50-49249

Int. Cl.[2] B01D *43/30*

U.S. Cl. 55—98 **4 Claims**

1. A method for the removal of the dusts from combustion

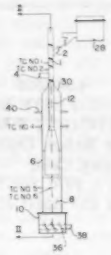
exhaust gases by a fixed packed bed, which comprises passing a dust-containing combustion exhaust gas through a fixed packed bed filled with a spherical, cylindrical or annular filler material containing pores having a pore diameter which ranges from 100–70,000A and a pore volume of not less than 0.1 cm^3/g at least 20% of said pores having a diameter of not less than 1,000A, said filler material making up said bed having a minimum of 1 to 15mm.

4,042,353

METHOD AND APPARATUS FOR FILTERING THROUGH PARTICULATE MATERIAL

Richard D. Warda, Fort Saskatchewan; Robert K. Buhr, Kanata, and John E. Rehder, Montreal, all of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Jan. 27, 1975, Ser. No. 544,623
Claims priority, application Canada, Feb. 22, 1974, 193274
Int. Cl.[2] B01D *46/32*
U.S. Cl. 55—99 **6 Claims**



1. A method of treating a solid particulate material with a gas, comprising:

a. feeding, as a major portion of the particulate material to be treated, a first feed comprising coarse particles predominantly in the range 30 mesh to $\frac{1}{4}$ inch into an upper portion of an upwardly extending, elongated casing,

b. feeding a particulate material treating gas into the casing at a position below the first feed thereto and below a gas outlet therefrom,

c. feeding, as a minor portion of the particulate material to be treated, a second feed comprising at least 50% by weight of fines predominantly in the range 140 mesh to 30 mesh, the remainder being superfines, into the upwardly extending elongated casing at a position at least as high as the level at which the treating gas is fed thereto,

d. allowing the coarse particles of the first feed, and at least a major portion of the fines, and a minor portion of the superfines, of the second feed to freely gravitate downwardly in the casing in counterflow to the flow of substantially all of the gas to the gas outlet, and accumulate as a packed particulate bed in a container sealed to the lower end of the casing and above means controlling the exit flow rate of particulate material from the container,

e. maintaining, by the means controlling the exit flow rate of the particulate material from the container, the height of the packed bed so that it:

i. covers a louvered, packed particulate bed retaining, gas inlet to one side of the container for passage of gas, fines and superfines to the packed bed therein,

ii. covers a louvered, packed particulate bed retaining, gas outlet facing the louvered, packed particulate bed retaining, gas inlet from another side of the container for passage of gas from the packed bed therein, and

iii. causes substantially all of the treating gas to flow upwardly as a gas stream along the casing so that the remaining superfines and any remaining fines are entrained in the gas stream and are carried thereby upwardly along the casing as entrained particles to the gas outlet from the casing,

f. conveying the entrained particles solely by means of the gas stream pressure in the casing, from the casing gas outlet, downwardly by a pipe having a substantially unobstructed bore and finally extending along a curved path to the louvered packed particulate bed retaining, gas inlet,

g. conveying at least a fraction of the entrained particles finer than the remainder thereof through the louvered, packed particulate bed retaining, gas inlet by the gas stream,

h. filtering a substantial portion of the entrained particles, conveyed by the gas stream through the packed particulate bed retaining, gas inlet, by passage of these entrained particles and at least a substantial portion of the gas stream through the packed particulate bed, in a transverse direction to the direction of flow of the packed particulate bed, towards the louvered, packed particulate bed retaining, gas outlet, and

i. conveying gas of the gas stream escaping from the container through the louvered, packed particulate bed retaining, gas outlet and upwardly and away therefrom and wherein,

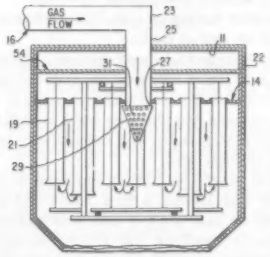
j. the particulate material gravitating downwardly in the casing is directed by means of an inclined baffle towards a portion of the container interior adjacent the louvered, packed particulate bed retaining, gas inlet, so that the packed particulate bed has a predominance of the relatively finer particles therein adjacent the louvered, packed particulate bed retaining gas inlet, and a predominance of the relatively coarser particles therein adjacent the louvered, packed particulate bed retaining, gas outlet.

4,042,354

ELECTROSTATIC PRECIPITATOR HAVING AN IMPROVED DISCHARGE AND COLLECTOR ELECTRODE SYSTEM AND GAS DISTRIBUTION MEANS

William Howard Tully, Cockeysville, Md., assignor to Environmental Elements Corporation, Baltimore, Md.

Continuation-in-part of Ser. No. 440,132, Feb. 5, 1974, abandoned. This application May 30, 1975, Ser. No. 582,393
Int. Cl.[2] B03C *3/40*
U.S. Cl. 55—129 **6 Claims**



1. An improved electrostatic precipitator for removal of corrosive particles from a corrosive particle laden gas passing therethrough comprising:

a shell having a corrosive resistant lining secured thereto;

a corrosive resistant support plate secured to said shell of said precipitator;

first and second sets of juxtaposed corrosive resistant collector electrode tubes suspended from said support plate, said collector tubes of said second set being of larger diameter than those of said first set;

a corrosive resistant top support grid spaced above said support plate and insulated from said shell;

a corrosive resistant bottom guide grid spaced below said first and second sets of collector electrode tubes;

corrosive resistant discharge wires secured to said top sup-

port grid and said bottom guide grid and passing through the center of each collector electrode tube in said first set;

corrosive resistant discharge support members secured to said top support grid and said bottom guide grid and passing through the center of each collector electrode tube in said second set for supporting said bottom grid;

inlet port means for supplying said corrosive particle laden gas to the interior of said precipitator; and

outlet port means for removing the treated gas from said precipitator;

wherein the improvement comprises:

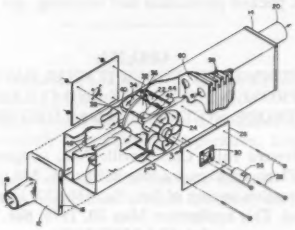
including in said electrostatic precipitator a pressure relief means having a one end connected between said shell and said lining below said support plate and having another end connected to the interior of said precipitator above said support plate for maintaining negative atmosphere pressure between said shell and said lining to prevent positive pressure between said shell and lining thereby maintaining said lining against said shell said pressure relief means being corrosive resistant.

4,042,355

POLLUTION CONTROL DEVICE

Paul W. Pearson, 7735 Mission Gorge Road, Santee, Calif. 92071

Filed Oct. 15, 1974, Ser. No. 514,829
Int. Cl.[2] B01D *50/00*
U.S. Cl. 55—319 **3 Claims**



1. A smog arrester comprising:

a. an enclosure having an inlet for attachment to a source of polluted air and an outlet;

b. a generally cylindrical wall disposed in said enclosure and having side plates covering the ends thereof and a generally circular wall orthogonally mounted in said cylindrical wall to define a first chamber and a second chamber larger than said first chamber and substantially sealed therefrom by said circular wall;

c. a coaxial shaft rotationally mounted in said cylindrical sidewall and having a first rotor and a second rotor mounted on said shaft in said first and second chamber respectively, each of said rotors having a plurality of blades radially extending from, and parallel to the axis of, said shaft, the blades of both of said rotors being of substantially the same length and extending substantially to said cylindrical wall and the blades of the second rotor being wider in the axial direction than the blades of the first rotor such that the second rotor is capable of moving more gas than the first rotor when both rotors have the same angular velocity;

d. means defining a complete passageway within said enclosure from said inlet to said outlet via said rotors, comprising:

i. said circular wall having an entry aperture into said first chamber and ducting connecting said inlet thereto to deliver gas from said first rotor;

ii. said circular wall having an exit aperture in said first chamber and an entry aperture in said second chamber, and including means mounted in said enclosure defining a gas expansion passageway from said first chamber exit to said second chamber entry aperture; and

iii. a baffle housing portion in said enclosure communicating with said enclosure outlet and including an exit aperture in said circular wall leading from said second chamber and communicating with said baffle housing portion; and

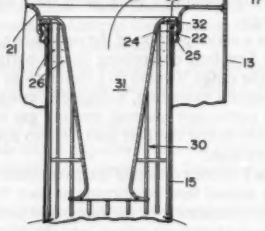
e. a plurality of baffles disposed in the baffle housing portion of said enclosure, whereby gas forced into said inlet enters said first chamber to cause rotation of said first rotor directly and said second rotor indirectly, thus causing a reduced gas pressure in said expansion passageway, and said gas then passes through said expansion passageway and said second chamber and through said baffles and through said outlet such that impingement of said gas on said baffles causes the precipitation of suspended particulates thereon.

4,042,356

BAG HOUSE CELL PLATE AND FILTER BAG ATTACHMENT THERETO

Edward M. Miller, San Rafael, Calif., assignor to Industrial Clean Air, Inc., Berkeley, Calif.

Filed Mar. 3, 1976, Ser. No. 663,554
Int. Cl.[2] B01D *46/02*
U.S. Cl. 55—341 R **7 Claims**



1. In an enclosed bag house having a horizontal cell plate dividing the interior of said house into upper and lower compartments, said bag house having means forming a gas inlet into one of said compartments and means forming a gas outlet from the other of said compartments, said cell plate being of metal sheet material and having a plurality of circular openings therethrough between said compartments and a plurality of vertically disposed tubular filter bags in one of said compartments, said bags each being open at one end and closed at the other end, said bags being attached to said cell plate with the open end of each bag being in communication with one of said cell plate openings, the improvement wherein:

each of said cell plate openings is formed by an annular wall integral with said cell plate and drawn therefrom, said wall extending vertically from the plane of said cell plate and terminating in an inwardly facing lip, said lip lying in a plane parallel to the plane of said cell plate and spaced a substantial distance vertically therefrom,

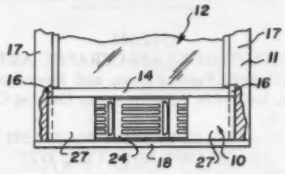
and wherein at least one of said bags includes a hoop-shaped resilient spring at its open end and means forming an outwardly facing groove around the periphery of said open end of said one bag, and wherein said groove has received therewithin the lip of the annular wall forming the cell plate opening in communication with the open end of said at least one bag.

4,042,357

AIR FILTER UNIT FOR SLIDING SASH WINDOWS

Rose Eleanor Gysi, 637 Linden Ave., Victoria, British Columbia, Canada (V8V 4G6)

Filed Apr. 28, 1976, Ser. No. 681,059
Int. Cl.[2] B01D *45/00*
U.S. Cl. 55—417 2 Claims



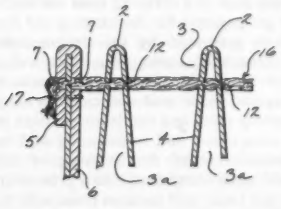
1. A filter unit to be fitted in the frame of a sliding sash window between the sash and the bottom or the top of the frame, comprising a central member of substantially rectangular cross section, two end members of substantially rectangular cross section, each of said end members being dimensioned to receive and slidably fit over an adjacent end of the central member; each of said end members having front and rear walls and upper and lower edges, said upper and lower edges lying over upper and lower edges of the central member; ventilating apertures in front and rear walls of the central member through which air can flow through said central member, a filter pad in the central member through which said air must flow, said central member having a vertical slot in the rear wall thereof through which said filter pad can be inserted and removed from the central member, an air impervious sheet removably mounted in the central member extending longitudinally thereof and between the apertures of the front and rear walls selectively to prevent air from flowing therethrough, an end portion of said impervious sheet normally projecting through said vertical slot and by means of which the sheet can be grasped and partially or completely withdrawn through said vertical slot, and filler strips on and extending the length of said upper and lower edges of the central member and having outer surfaces facing away from the central member, said upper and lower edges of the end members having slots therein to accommodate the filler strips of the central member, the outer surfaces of said filler strips and the upper and lower edges of the end members being in upper and lower common planes and forming continuous upper and lower edges for said filter unit and extending the full length thereof whereby, when said unit is placed between a window sash and the frame thereof, there is no space between the sash and the frame of air to flow through.

4,042,358

FILTER MEDIA

Stanley H. Frohmader, Madison, Wis., assignor to Research Products Corporation, Madison, Wis.

Filed May 14, 1976, Ser. No. 686,386
Int. Cl.[2] B01D *46/52*
U.S. Cl. 55—497 7 Claims



1. An air filter comprising, in combination:

a. a collapsible expandible accordian-shaped filter body having reverse folds forming pockets having common walls therebetween,

b. said walls having at least one row of aligned holes disposed therein,

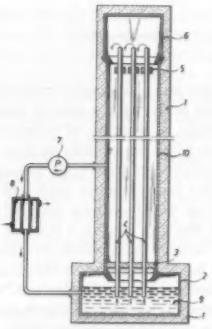
c. and an elongated string-like member threaded through said holes and with said string-like member forming means which frictionally engages the edges of said holes so that said walls are fixedly held in place along said member by said frictional engagement when said filter body is expanded.

4,042,359

PROCESS FOR PRODUCTION OF POROUS GLASS MEMBRANE TUBES

Roland Schnabel, Hofheim; Alexander Hölzel, Mainz-Finthen, and Kurt Gotter, Mainz, all of Germany, assignors to Jenaer, Glaswerk, Schott & Gen., Mainz, Germany

Filed Nov. 13, 1975, Ser. No. 631,471
Claims priority, application Germany, Nov. 14, 1974, 2454111
Int. Cl.[2] C03B *37/02;* C03C *25/00*
U.S. Cl. 65—2 13 Claims



1. A process for the production of a microporous tubular glass self-supporting membrane in the form of a hollow fiber comprising the steps of:

I. drawing a hot endless thin walled glass hollow fiber from a melt of an alkali borosilicate glass, and then immediately,

II. directly cooling the hot hollow fiber by cooling devices which are arranged directly beneath the tip sufficient to fix its external shape and internal structure the walls of the separate fibers being free, and then

III. heating the hollow fiber to a temperature sufficient to effect phase separation into

A. a coherent, silicon dioxide phase, which is substantially insoluble in mineral acid, and,

B. a boron oxide phase rich in alkali borate and then

IV. extracting the hollow fiber with mineral acid by circulating the acid along the inside wall and the outside wall of the hollow fiber thereby dissolving out the boron oxide phase, thereby forming a microporous tubular glass membrane of the substantially insoluble silicon dioxide phase,

wherein the hollow fiber has initial pore sizes between 11 A and 50 A and

wherein the glass has the following composition by weight:

A. B_2O_3 20–35% by weight.

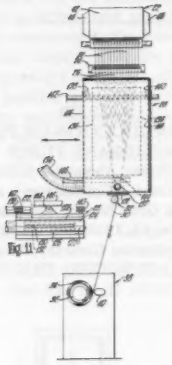
B. Alkali metal oxide 4–12% by weight.

SiO_2 balance essentially.

4,042,360
PRODUCTION OF INORGANIC FIBERS WITH INORGANIC CORES

John L. Kane, and George R. Machlan, both of Newark, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Division of Ser. No. 557,721, March 12, 1975, Pat. No. 4,013,435. This application Oct. 29, 1975, Ser. No. 626,952
Int. Cl.[2] C03B *37/02*
U.S. Cl. 65—11 W 19 Claims



1. Apparatus for coating filaments comprising an applicator having an elongate body with a central supply chamber extending therethrough, a plurality of transverse grooves positioned in a common plane on an outer surface of said body, said body having a plurality of transverse passages, each of said passages connecting said chamber with one of said grooves, means for supplying liquid coating material to said chamber under pressure, a bushing having a bottom with a predetermined number of orifices from which the filaments are attenuated, said orifices being staggered so that lines taken centrally through the orifices and perpendicular to a line parallel to the longitudinal extent of the bushing bottom are equally spaced.

6. Apparatus for coating fibers comprising an applicator for applying coating material to a plurality of the fibers located in a common plane, means spaced from said applicator for collecting the coated fibers, and an oven, said oven comprising a housing, heating panels within said housing and forming a passage extending from one end of the housing to the other and having an elongate transverse cross-sectional shape, said housing having a slot communicating with said passage substantially over the length of said housing, and means for movably supporting said oven between a position in which said passage is located between substantially aligned with said applicator and said collecting means and a position in which said housing is to one side of said applicator and said collecting means.

4,042,361
METHOD OF DENSIFYING METAL OXIDES

Peter P. Bihuniak, Corning; Lewis H. Brandes, Campbell, and Donald L. Guile, Horseheads, all of N.Y., assignors to Corning Glass Works, Corning, N.Y.

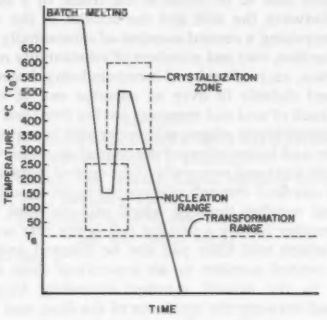
Filed Apr. 26, 1976, Ser. No. 680,061
Int. Cl.[2] C03B *23/20, 19/10*
U.S. Cl. 65—18 3 Claims

1. A method of producing a fused silica glass article from fumed silica which comprises,
   a. mixing fumed silica with a polar liquid to form a flowable silica sol containing up to 45% solids content,
   b. removing the liquid from the sol to produce a fragmented solid,
   c. calcining the fragmented solid within the temperature range of 1150° C. to 1500° C. to densify the fragments,
   d. milling the densified particles with a casting medium to form a casting slip wherein the particles are essentially in the range of one to ten microns,
   e. casting the slip in a mold to form a "cast" body, and firing said cast body at a temperature on the order of 1800° C. to 1900° C.

4,042,362
PRODUCTION OF GLASS-CERAMIC ARTICLES

John F. MacDowell, Painted Post, and Hermann L. Rittler, Horseheads, both of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed May 18, 1976, Ser. No. 687,591
Int. Cl.[2] C03B *32/00;* C03C *3/22*
U.S. Cl. 65—33 6 Claims



1. A method for making a fine-grained glass-ceramic article comprising the steps of:
   a. melting a batch for a thermally crystallizable glass;
   b. cooling the melt to a temperature between about 25°–250° C. above the transformation range to form a glass body and holding said glass body within that range of temperatures for about 1–30 minutes to develop nuclei therein;
   c. heating the nucleated glass body at a rate of at least 10° C./minute to a temperature about 100°–500° C. above the nucleation temperature and holding said nucleated glass body within that range of temperatures for about 1–30 minutes to cause the growth of crystals on the nuclei;
   d. cooling the crystallized body to room temperature.

4,042,363
METHOD AND APPARATUS FOR COATING GLASS

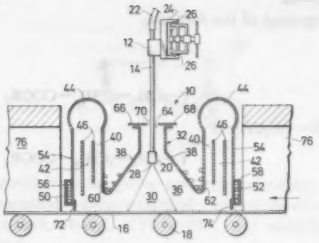
Takeshi Maeda, and Seiki Okino, both of Matsusaka, Japan, assignors to Central Glass Co., Ltd., Ube, Japan

Filed Apr. 23, 1976, Ser. No. 679,708
Claims priority, application Japan, Apr. 25, 1975, 50-50517
Int. Cl.[2] C03C *17/10*
U.S. Cl. 65—60 R 8 Claims

1. A process for fabricating heat-reflecting glass comprising the steps of spraying a solution of a metal compound onto one side of a hot glass sheet in a spraying zone enclosed by a hood having exhaust gas passages for discharging and removing the exhaust which is generated by the decomposition of the sprayed metal compound; cooling the inner wall surfaces of said hood which surrounds said spraying zone and the atmosphere adjoining said inner wall surfaces to a temperature of between the melting point and the decomposition temperature of said metal compound, and maintaining said temperature during the continuation of the spraying of said solution whereby the said metal compound that is present in said atmosphere adjacent said inner wall surfaces remains in an undecomposed state and is allowed to evaporate and be entrained in said exhaust gas leaving the said spraying zone.

3. An apparatus for fabricating heat-reflecting glass sheets

comprising spraying means supported over a transfer line of a hot elongated glass sheet, said spraying means being reciprocating movable in a transverse direction for spraying a solution of a metal compound onto the upper surface of the glass sheet entering a spraying zone; a hood having a downwardly diverging intermediate portion enclosing said spraying zone and upright end portions forming exhaust gas passages on the front and rearward sides of said spraying zone for the exhaust gas to be purged from said spraying zone; temperature control means



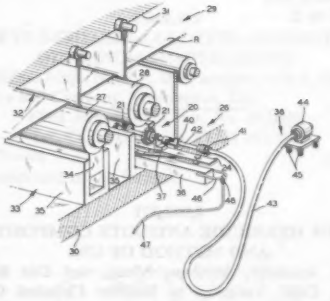
mounted in operable association with said hood to maintain the temperatures of said inner wall surfaces of said downwardly divering intermediate portions and said upright end portions and the atmosphere adjoining said innerwall surfaces at temperatures of between the melting point and the decomposition temperature of said metal compound whereby the said metal compound that is present in the said atmosphere adjacent said inner wall surfaces remains in an undecomposed state and evaporates and is entrained in the exhaust gas leaving said exhaust gas passages.

4,042,364

CLEANING APPARATUS FOR CONVEYOR ROLLS

Roger P. King, Waterville; John W. Grosskopf, Jr., and Francis C. Bondelier, Jr., both of Perrysburg, all of Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Apr. 8, 1976, Ser. No. 674,834
Int. Cl.[2] C03B *13/18, 18/02*
U.S. Cl. 65—168 **15 Claims**



1. A cleaning apparatus for removing uneven and crusty deposits from and burnishing the cylindrical surfaces of conveyor rolls which support and convey a ribbon of glass in a direction transverse to the axes of the rolls, said apparatus comprising:

a. a support plate;

b. an annular cleaning device mounted on said support plate and engageable with the cylindrical surfaces of said conveyor rolls;

c. means for rotating said annular cleaning device; and

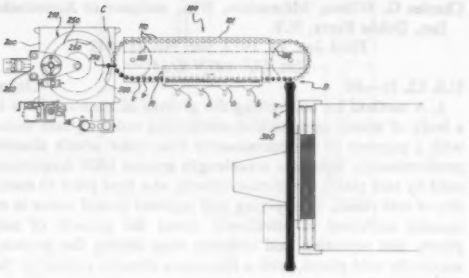
d. means for yieldingly urging said support plate in a direction perpendicularly to said conveying rolls and said annular cleaning device into engagement with the conveying surfaces of said rolls.

4,042,365

CONVEYOR INSTALLATION FOR THE TREATMENT AND TRANSPORT OF GLASS ARTICLES

Paul Champenois, Guignicourt, France, assignor to Verreries Mecaniques Champenoises, Reims, France

Filed Mar. 18, 1976, Ser. No. 667,979
Claims priority, application France, Dec. 19, 1975, 75.39083
Int. Cl.[2] C03B *29/04*
U.S. Cl. 65—260 **10 Claims**



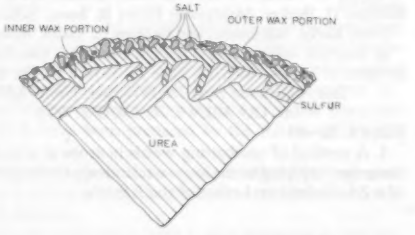
1. An installation for the flame treatment of articles, comprising a chain, a supply means, a loading point and an unloading point, a flame treatment zone comprising a series of burners, and a plurality of rotatable turntables driven linearly and cyclically by said chain between said loading point, at which said articles are loaded onto said turntables by said supply means, and said unloading point, passing through said flame treatment zone; wherein said supply means comprises a molding press, at least one intermediate point, and transfer means for transferring one of said articles from said intermediate point to one of said turntables while the following article is transferred from said press to said intermediate point.

4,042,366

CONTROLLED RELEASE FERTILIZER

Kenneth Eugene Fersch, Marysville, and Wayne Eugene Stearns, West Mansfield, both of Ohio, assignors to The O.M. Scott & Sons Company, Marysville, Ohio

Filed Apr. 5, 1976, Ser. No. 673,791
Int. Cl.[2] C05B *15/00;* **C05C** *9/00*
U.S. Cl. 71—29 **11 Claims**



1. A controlled release fertilizer composition in particulate form, each of said particles comprising nitrogen in a form which is slowly released and an inorganic water soluble additive in a form which is quickly released, each of said particles comprising

a core of water soluble nitrogen nutrient source,

a coating of sulfur surrounding said core, and

a coating surrounding said sulfur coating of wax, said coat-

ing comprising an inner portion free of water soluble additives and an outer water soluble additive-containing portion, the inner portion completely covering said sulfur coating and forming a water barrier separating said outer portion from said sulfur coating, the outer portion containing embedded therein particles of at least one inorganic water soluble solid additive of from 325 to 30 mesh size, the ratio by weight of the solid additive to the total weight of said wax being less than 8.

4,042,367

METHOD FOR CONTROLLING THE GROWTH OF AQUATIC PLANTS

Charles G. Wilson, Milwaukee, Wis., assignor to Aquashade, Inc., Dobbs Ferry, N.Y.

Filed Jan. 14, 1972, Ser. No. 217,952
Int. Cl.² A01N 9/14
U.S. Cl. 71—66 **7 Claims**

1. A method for controlling the growth of aquatic plants in a body of water, said method comprising coloring said water with a pigment of a predominantly blue color which absorbs predominantly light of a wavelength around 6500 Angstroms used by said plants for photosynthesis, at a time prior to maturity of said plants, by applying said pigment to said water in an amount sufficient to effectively arrest the growth of said plants, and repeating said coloring step, during the growing season for said plants, with a frequency directly related to the length of the growing season for said plants.

4,042,368

ADDITIVE FOR QUATERNARY AMINE BACTERICIDES AND ALGICIDES, COMPOSITIONS CONTAINING SAME AND METHOD OF MANUFACTURE

Andrew A. Argiriardi, Brooklyn, N.Y., assignor to Epic Chemical Inc., Brooklyn, N.Y.

Filed June 27, 1975, Ser. No. 590,977
Int. Cl.² A01N 9/20
U.S. Cl. 71—67 **5 Claims**

1. A composition useful as a bactericide and an algicide, comprising a mixture of tris (2-hydroxyethyl) benzyl ammonium chloride, and an n-alkyl dimethyl benzalkonium chloride, wherein said n-alkyl group is 10 to 18 carbon atoms in length, the ratio of said tris (2-hydroxyethyl)benzyl ammonium chloride to said benzalkonium chloride being such that the phenol coefficient of the mixture is substantially higher than the weighted average of the components.

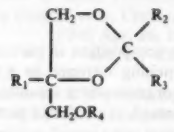
4,042,369

COMPOSITIONS AND METHODS OF COMBATTING WEEDS IN CROPS WITH 2,6-DIHALOBENZYL ETHER

Michael D. Barker, Maidstone; Eirlys R. Isaac, Sittingbourne; Peter Kirby, Maidstone, and Graham C. Smith, Ramsgate, all of England, assignors to Shell Oil Company, Houston, Tex.

Division of Ser. No. 481,723, June 21, 1974, Pat. No. 3,919,252. This application Apr. 28, 1975, Ser. No. 572,535
Int. Cl.² A01N 9/28; C07D 317/16
U.S. Cl. 71—88 **8 Claims**

1. A method of combatting weeds in crops at a locus which comprises applying to the locus a selectively herbicidal amount of a 2,6-dihalobenzyl ether of the formula



wherein R_1 and R_2 each is methyl or ethyl; R_3 is hydrogen, methyl or ethyl and R_4 is 2,6-dichlorobenzyl, 2-chloro-6-fluoro-benzyl or 2,6-difluorobenzyl.

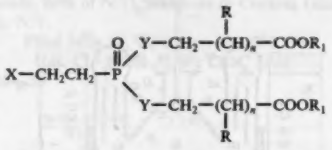
4,042,370

DI-(ACYLOXYALKYL)-β-HALOETHANE-PHOSPHONATES AND DITHIOPHOSPHONATES AND USE AS PLANT GROWTH REGULATORS

Werner Trueb, Therwil, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Filed Sept. 11, 1975, Ser. No. 612,501
Claims priority, application Switzerland, Sept. 18, 1974, 12677/74
Int. Cl.² A01N 9/36; C07F 9/40
U.S. Cl. 71—86 **14 Claims**

1. A compound of the formula:



wherein

X is chlorine or bromine,

Y is oxygen or sulfur,

R is hydrogen, C_1–C_6 alkyl, C_3–C_6 cycloalkyl, unsubstituted phenyl or phenyl substituted by one or more members selected from the group consisting of fluoro, chloro, bromo, cyano, carboxy, C_2–C_8 alkoxycarbonyl, C_2–C_8 alkylcarbamoyl, trihaloalkyl, C_1–C_8 alkylsulphinyl, unsubstituted phenylsulphinyl, phenylsulphinyl substituted by a methyl or ethyl group or two methyl groups, C_1–C_8 alkylsulphonyl, unsubstituted phenylsulphonyl, phenylsulphonyl substituted by a methyl or ethyl group or two methyl groups, and nitro,

R_1 is C_1–C_8 alkyl, C_3–C_6 cycloalkyl, unsubstituted phenyl or phenyl substituted by one or more members selected from the group consisting of fluoro, chloro, bromo, cyano, carboxy, C_2–C_8 alkoxycarbonyl, C_2–C_8 alkylcarbamoyl, trihaloalkyl, C_1–C_8 alkylsulphinyl, unsubstituted phenylsulphinyl, phenylsulphinyl substituted by a methyl or ethyl group or two methyl groups, C_1–C_8 alkylsulphonyl, unsubstituted phenylsulphonyl, phenylsulphonyl substituted by a methyl or ethyl group or two methyl groups, and nitro, and

n is 0, 1 or 2.

4,042,371

SULFIDE HERBICIDE ANTIDOTE COMPOSITIONS AND METHOD OF USE

Duane R. Arneklev, Antelope, Mont., and Don R. Baker, Orinda, Calif., assignors to Stauffer Chemical Company, Westport, Conn.

Continuation of Ser. No. 394,230, Sept. 4, 1973, abandoned. This application June 27, 1975, Ser. No. 591,257
Int. Cl.² A01N 9/00
U.S. Cl. 71—88 **11 Claims**

1. An herbicide composition comprising an effective amount of a mixture of a thiocarbamate herbicide and an antidotally effective amount of an antidote compound corresponding to the formula

in which R_1 is 3,3-dichloroallyl and R_2 is 3,3-dichloroallyl.

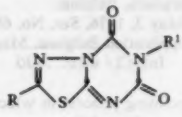
4,042,372

SUBSTITUTED THIADIAZOLOTRIAZINEDIONES AND METHOD OF PREPARATION

Richard W. Harper, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Nov. 19, 1976, Ser. No. 743,439
Int. Cl.² C07D 513/04; A01N 9/12
U.S. Cl. 71—90 12 Claims

1. A compound of the formula



wherein

R is selected from the group consisting of methyl, chlorodifluoromethyl, difluoromethyl, trifluoromethyl, pentafluoroethyl, t-butyl, $(CH_3)_2NSO_2$, and morpholinosulfonyl; and

R^1 is hydrogen, methyl, ethyl, ally, phenyl, p-nitrophenyl, or 3,5-dichlorophenyl.

7. A method of controlling unwanted vegetation which comprises the application to the locus of the vegetation of an herbicidally-effective amount of a compound selected from the group consisting of 6-methyl-2-(trifluoromethyl)-5H-1,3,4-thiadiazolo[3,2-a]-s-triazine-5,7(6H)-dione, 2-(dimethylsulfamoyl)-6-methyl-5H-1,3,4-thiadiazolo[3,2-a]-s-triazine-5,7(6H)-dione, 2-(difluoromethyl)-6-methyl-5H-1,3,4-thiadiazolo[3,2-a]-s-triazine-5,7(6H)-dione, 6-methyl-2-(morpholinosulfonyl)-5H-1,3,4-thiadiazolo[3,2-a]-s-triazine-5,7(6H)-dione, and 6-ethyl-2-(trifluoromethyl)-5H-1,3,4-thiadiazolo[3,2-a]-s-triazine-5,7(6H)-dione.

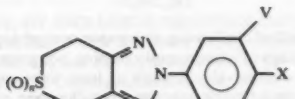
4,042,373

2-ARYL-3-CHLORO-2,4,6,7-TETRAHYDROTHIOPYRANO[4,3-C]-PYRAZOLES

Steven William Moje, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed June 2, 1976, Ser. No. 692,052
Int. Cl.² A01N 9/14; C07D 495/04
U.S. Cl. 71--91 25 Claims

1. A compound of the formula



where

n is 0, 1, or 2;

Q is chlorine or bromine;

X is fluorine, chlorine, bromine, or cyano;

Y is hydrogen, fluorine, or chlorine; and

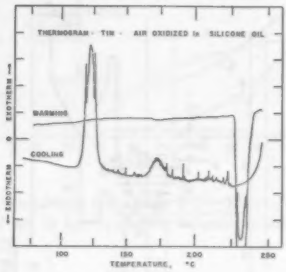
V is hydrogen, fluorine, chlorine or alkoxy of 1 to 3 carbon atoms.

4,042,374

MICRON SIZED SPHERICAL DROPLETS OF METALS AND METHOD

Don H. Rasmussen, and Carl R. Loper, Jr., both of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Mar. 20, 1975, Ser. No. 560,478
Int. Cl.² B22D 23/08
U.S. Cl. 75—.5 B 23 Claims



1. The method of preparing micron sized spherical droplets of metals comprising the steps of emulsifying the metal in a molten state in an inert carrier fluid and reacting the molten metal while in the emulsified state in the fluid to form a reaction product on the surface while stabilizes the metal droplets in the emulsion.

4,042,375

ROASTING PROCESS FOR THE DIRECT REDUCTION OF ORES

Anwyn Margaret Martin, Prahran; Donald Ferguson Stewart, Doncaster, and Andrew Baikie Swanson, North Melbourne, all of Australia, assignors to ICI Australia Limited, Melbourne, Australia

Filed Oct. 6, 1975, Ser. No. 620,047
Claims priority, application Australia, Oct. 14, 1974, 9267/74
Int. Cl.² C22B 1/08, 1/24
U.S. Cl. 75—4 6 Claims

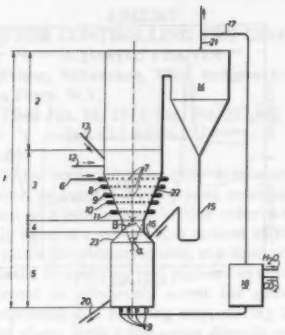
1. In a process for the direct reduction of ores containing iron oxides by the reductive roasting of pellets containing the ore, the improvement whereby the pellets retain their pellet form during reduction and have a reduced tendency to coalesce, said improvement comprising using for said reduction pellets which have been prepared by the following steps in sequence;

1. forming core pellets consisting essentially of finely ground ore or a mixture of finely ground ore and solid carbonaceous material;
2. coating the core pellets with a coke precursor so that the ratio of skin thickness of coke precursors to the diameter of the coke pellets is in the range from 1:20 to 1:2;
3. heating the coated pellets in a substantially non oxidizing atmosphere to a temperature below 1200° C but high enough to cause the coke precursor to form a coke skin around the coke pellet; the coke precursor comprising from 5 to 25% of a halide salt chosen from the group consisting of chlorides, alkaline earth metal chlorides and fluorides and ammonium chloride.

4,042,376
METHOD FOR CARRYING OUT ENDOTHERMIC REDUCTION PROCESSES IN A CIRCULATING FLUID BED AND AN APPARATUS THEREFOR

Per Harald Collin, Falun, Sweden, assignor to Stora Kopparbergs Bergslags Aktiebolag, Falun, Sweden

Filed Jan. 21, 1976, Ser. No. 650,882
Claims priority, application Sweden, Jan. 24, 1975, 75007971
Int. Cl.[2] C22B 1/10
U.S. Cl. 75—26 3 Claims



1. A method for carrying out endothermic reduction of a finely divided reducible solid material in a circulating fluid bed, comprising,

maintaining fluidization of said solid material in a vertically elongated reaction zone, said vertically elongated zone comprising an upper zone, an intermediate zone, a transport zone and a lower zone, the intermediate and lower zones of which are separated by said transport zone, wherein a gas velocity in said transport zone is so high as to transport essentially all materials entering said transport zone from the lower to the intermediate zone,

generating the heat necessary for the endothermic reduction process in the intermediate zone by partial combustion therein, with molecular oxygen, oxidic and carbonaceous materials, said oxidic and carbonaceous materials also being introduced into said intermediate zone,

transferring part of heat generated by the partial combustion in said intermediate zone to the lower zone of the verticaly elongated reaction zone by withdrawing gases and solid material from said upper zone and separating gases from solid material, the solid material being introduced in the lower zone,

after dust precipitation and elimination of the major part of H_2O and CO_2, utilizing a partial stream of said gases which were separated for the purpose of fluidization and reduction, in the lower zone of the reaction zone, said solid material introduced therein, and

discharging a reduced material preferably from the bottom part of said lower zone.

4,042,377
METHOD OF AND COMPOSITION FOR THE DESULFURIZATION OF STEEL

Gerard Bienvenu, Annemasse, France, and Claude Gentaz, Grand-Lancy, Geneva, Switzerland, assignors to Battelle Memorial Institute, Carouge, Geneva, Switzerland

Filed Dec. 16, 1974, Ser. No. 532,860
Claims priority, application Switzerland, Dec. 14, 1973, 17528/73
Int. Cl.[2] C21C 7/02
U.S. Cl. 75—53 23 Claims

1. A process for treating a molten metal which includes contacting said molten metal with a mixture comprising at least one first compound selected from the group consisting of the halides and oxides of the metallic elements of groups Ia, IIa and IIIb of the periodic classification of the elements and at least one second compound capable of reducing said first compound to the corresponding metallic element in said molten metal, wherein said mixture is in the form of a single liquid homogeneous phase at the temperature of said molten metal.

4,042,378
CONTROLLING PIG IRON REFINING

Daniel Leon Ramelot, Saint-Nicolas, Belgium, assignor to Centre de Recherches Metallurgiques-Centrum voor Research in de Metallurgie, Brussels, Belgium

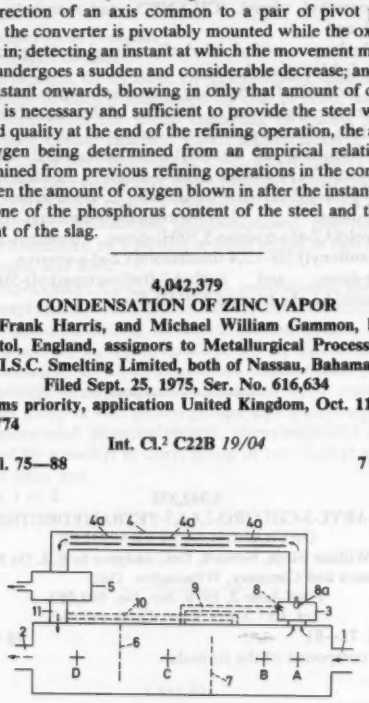
Filed May 3, 1976, Ser. No. 682,668
Claims priority, application Belgium, May 7, 1975, 828855
Int. Cl.[2] C21C 5/30
U.S. Cl. 75—60 7 Claims

1. In a pig iron refining process in which industrially pure oxygen is blown into molten pig iron surmounted by a layer of slag in a converter by means of at least one tuyere located below the upper surface of the molten metal, in order to obtain steel of a desired quality, the improvement comprising the steps of: continuously measuring movement of the converter in the direction of an axis common to a pair of pivot pins on which the converter is pivotably mounted while the oxygen is blown in; detecting an instant at which the movement measurement undergoes a sudden and considerable decrease; and, from that instant onwards, blowing in only that amount of oxygen, which is necessary and sufficient to provide the steel with the desired quality at the end of the refining operation, the amount of oxygen being determined from an empirical relationship, determined from previous refining operations in the converter, between the amount of oxygen blown in after the instant and at least one of the phosphorus content of the steel and the iron content of the slag.

4,042,379
CONDENSATION OF ZINC VAPOR

Colin Frank Harris, and Michael William Gammon, both of Bristol, England, assignors to Metallurgical Processes Ltd. and I.S.C. Smelting Limited, both of Nassau, Bahamas

Filed Sept. 25, 1975, Ser. No. 616,634
Claims priority, application United Kingdom, Oct. 11, 1974, 44066/74
Int. Cl.[2] C22B 19/04
U.S. Cl. 75—88 7 Claims



1. A method of condensing zinc vapor comprising, in combination, the steps of: continuously passing hot gases containing zinc vapor successively through at least three condensation chambers from a first chamber to a last chamber; continuously passing molten lead countercurrently to the hot gases successively through the condensation chambers from the last chamber to the first chamber; continuously generating a spray of molten lead droplets in each of the condensation chambers by rotating at least one impeller immersed in molten lead in each of the condensation chambers to condense the zinc vapor; continuously recycling molten lead from the first chamber to the last chamber comprising the steps of exiting molten lead containing condensed zinc from the first chamber, cooling the exiting molten lead containing the condensed zinc, separating the condensed zinc from the cooled molten lead and feeding

the cooled molten lead to the last condensation chamber; and continuously recycling to a chamber intermediate the first chamber and the last chamber, molten lead at a temperature greater than the temperature of the molten lead in the intermediate chamber, to increase the temperature of the molten lead in the intermediate chamber to within the range of from 475° to 515° C.

4,042,380

GRAIN REFINED FREE-MACHINING STEEL

Yoshihiro Yamaguchi, Ashiya; Takashi Shimohata, Akashi; Sodai Kita, and Yoshihide Fuchino, both of Kobe, Tsuglo Kaneda, Akashi; Masashi Kawauchi; Sadayashi Furusawa; Shuzi Iwata, all of Japan, assignors to Kobe Steel, Ltd., Kobe, Japan

Filed May 14, 1976, Ser. No. 686,576
Claims priority, application Japan, May 14, 1975, 50-57698
Int. Cl.[2] C22C *38/14, 38/60*
U.S. Cl. 75—124 5 Claims

1. A grain-refined free-machining steel consisting essentially of 0.08 to 0.6 percent carbon, 0.35 percent or less silicon, 0.3 to 1.5 percent manganese, 0.04 to 0.15 percent sulfur, 0.01 to 0.05 percent aluminum, 0.01 to 0.08 percent niobium, 0.0035 to 0.008 percent oxygen, 0.008 percent or less nitrogen, zirconium, and the balance iron wherein the ratio of the effective zirconium to sulfur is from 0.2 to 1.2 and the amount of effective zirconium is:

$$\text{effective zirconium} = Zr\% - 2.9 \times O\% - 6.5 \times N\%$$

and wherein the ratio length to width of the sulfides in said steel averages 6.0 or less and the size of said sulfides in terms of length X width averages from 40 to 200 square microns.

4,042,381

CONTROL OF INCLUSION MORPHOLOGY IN STEEL

Jerry D. Thomas, North Royalton, Ohio; William F. Hladio, Homewood, Ill., and Leo V. Scott, Warren, Ohio, assignors to Republic Steel Corporation, Cleveland, Ohio

Filed July 6, 1976, Ser. No. 702,427
Int. Cl.[2] C21C *7/00;* C22C *33/00*
U.S. Cl. 75—129 9 Claims

1. A method of producing steel characterized by shaped sulfide inclusions comprising the steps of preparing a steel melt containing in amounts by weight:

at least 0.020% aluminum
no more than 0.010% nitrogen
no more than 0.025% sulfur
no more than 0.70% manganese

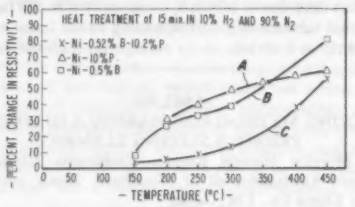
and incorporating in said melt from 0.020–0.080% titanium and from 0.020–0.060% of at least one rare earth metal.

4,042,382

TEMPERATURE-STABLE NON-MAGNETIC ALLOY

Nathan Feldstein, Princeton, N.J., assignor to RCA Corporation, New York, N.Y.

Division of Ser. No. 531,396, Dec. 10, 1974, Pat. No. 3,953,654, which is a division of Ser. No. 387,601, Aug. 13, 1973, abandoned. This application Jan. 23, 1976, Ser. No. 651,797
Int. Cl.[2] C22C *19/03*
U.S. Cl. 75—170 1 Claim



1. An alloy consisting essentially of 5 - 16 wt. % phosphorus, 0.1 to 0.7 wt. % boron and the balance nickel.

4,042,383

WROUGHT FILLER METAL FOR WELDING HIGHLY-CASTABLE, OXIDATION RESISTANT, NICKEL-CONTAINING ALLOYS

Walter Adrian Petersen, Ridgewood, N.J., and Robin Mackay Forbes Jones, Suffern, N.Y., assignors to The International Nickel Company, Inc., New York, N.Y.

Continuation of Ser. No. 487,316, July 10, 1974, abandoned. This application May 17, 1976, Ser. No. 686,721
The portion of the term of this patent subsequent to July 1, 1992, has been disclaimed.
Int. Cl.[2] C22C *19/05, 30/00*
U.S. Cl. 75—171 4 Claims

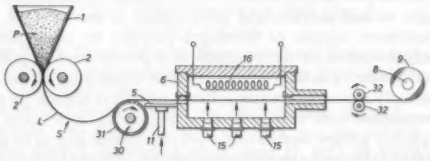
1. A hot-workable, cold-workable welding filler metal characterized by a capability for producing sound, oxidation-resistant weld deposits consisting essentially of (by weight) up to about 0.1% carbon, up to about 2% manganese, up to about 1% silicon, from about 19% to about 24% chromium, from about 15% to about 25% iron, from about 0.12% to about 0.4% boron, from about 4% to about 8% molybdenum, and the balance essentially nickel.

4,042,384

PRODUCTION OF METAL STRIP FROM POWDER

George Jackson, Sheffield, and Terence Fieldsend, Rotherham, both of England, assignors to British Steel Corporation, London, England

Continuation of Ser. No. 462,991, April 22, 1974, abandoned. This application May 13, 1976, Ser. No. 686,249
Claims priority, application United Kingdom, Jan. 31, 1974, 4500/74; May 3, 1973, 21103/73
Int. Cl.[2] B22F *1/00, 7/00;* B65G *53/04;* B22F *3/18*
U.S. Cl. 75—214 20 Claims



1. A method of continuously producing metal strip from metal powder comprising the steps of continuously compacting the powder to form a continuous green strip, transporting the green strip to the entrance of a sinter furnace, isolating the

green strip from tensile stresses imposed in the strip upstream of the entrance of the sinter furnace, propelling the strip through the furnace and sintering it while supporting it on a gaseous cushion, isolating the strip during sintering from stresses imposed in the sintered strip downstream of the furnace, and correlating the speed at which the sintered strip is drawn from the furnace with the speed at which the strip enters the furnace to permit the strip to shrink during sintering, the speed at which the sintered strip is drawn from the furnace being less than that at which it is transported to the furnace by an amount substantially corresponding to the linear reduction of the strip as it shrinks on its passage through the furnace.

4,042,385

SINTERING METHOD FOR MAKING A HIGH CARBON FERROUS SLIDING ELEMENT

Kenji Miyake; Hiroshi Kumon; Yoshimaru Zitukane, and Shigeru Akutagawa, all of Hiroshima, Japan, assignors to Toyo Kogyo Co., Ltd., Japan

Filed Nov. 7, 1975, Ser. No. 629,906
Claims priority, application Japan, Nov. 9, 1974, 49-129326
Int. Cl.[2] B22F *3/00*
U.S. Cl. 75—224 **12 Claims**

1. A sintering method for making a high-carbon ferrous sliding element which comprises:

a. preparing a mixture of 2 to 5% by weight of carbon powder and the remainder being essentially iron powder;
b. subjecting said mixture to a compacting pressure of 4 to 8 ton/cm^2, thereby to form a green compact;
c. loading said green compact into a sintering box;
d. placing said sintering box containing the green compact into a furnace box;
e. heating said green compact within the furnace box for 10 to 60 minutes at an elevated temperature within the range of from 1000° C to eutectic temperature of the principal components of said green compact; and
f. holding the thus-heated compact in said sintering box within the furnace box for 10 to 30 minutes at a temperature of 800° to 1000° C within said furnace box for the restoration of carbon which has been decarburized during said heating step (e), said sintering box serving to enhance the carburization of the compact within the furnace at least during the holding step.

4,042,386

PHOTOSENSITIVE COMPOSITIONS

Sakuo Okai, and Koichi Kimoto, both of Kyoto, Japan, assignors to Napp Systems, San Marcos, Calif.

Filed June 7, 1976, Ser. No. 693,306
Int. Cl.[2] G03C *1/68*
U.S. Cl. 96—35.1 **18 Claims**

1. A water-developable photopolymerizable composition, comprising: a monomer component including at least one water soluble monofunctional unsaturated ethylenic monomer, and at least one polyfunctional unsaturated ethylenic monomer selected from the group consisting of an acrylic or methacrylic ester of a polyethylene glycol having the structural formula $[HO(CH_2CH_2O)_nH]$ wherein *n*, the number of ethylene oxide units in said polyethylene glycol ester, is one to eight, said monomers capable of forming a polymer by photoinitiated polymerization in the presence of a polymerization initiator activatable by actinic light; a polymer component including a partially saponified, water-soluble, polyvinyl acetate polymer compatible with said monomers, containing both acetyl and hydroxy groups, and having a polymerization degree of about 300 to 2,000, and a saponification degree of about 65 to 99 mole percent; and a photopolymerization initiator, compatible with said monomers and said polyvinyl acetate polymer, and activatable by actinic light; the ratio, by weight, of polyfunctional monomer to monofunctional monomer being in the range of from about 0.2 to about 0.6; and the ratio, by weight, of said monomer component to said polymer component being in the range of from about 0.7 to about 1.2.

16. A process for developing a photopolymer plate which includes a layer of photosensitive resin composition comprising a mixture of a polyfunctional ethylenically unsaturated monomer selected from the group consisting of an acrylic or methacrylic ester of a polyethylene glycol having the structural formula $[HO(CH_2CH_2O)_nH]$ wherein *n* is the number of ethylene oxide units in said polyethylene glycol ester, is one to eight and at least one water soluble monofunctional ethylenically unsaturated monomer, said mixture of monomers being capable of forming polymer by photoinitiated polymerization in the presence of a polymerization initiator activatable by actinic light, a partially saponified polyvinyl acetate having a degree of polymerization of about 300 to 2,000 and a degree of saponification of about 65 to 99 mole percent, and a benzoin alkylate initiator activatable by actinic light; the ratio, by weight, of polyfunctional monomer to monofunctional monomer being in the range of from about 0.2 to about 0.6, and the ratio of said mixture of monomers to said polyvinyl acetate being in the range of from about 0.7 to about 1.2, said process comprising the steps of:

subjecting said plate to a single exposure of actinic light having an intensity at the plate surface of from about 0.1 to about 0.2 watt per square inch and a wave length of about 360 nm;
removing the unexposed resin composition from said plate by washing with water; and
drying said plate.

4,042,387

PHOTOLITHOGRAPHIC METHOD OF MAKING MICROCIRCUITS USING GLYCERINE IN PHOTORESIST STRIPPING SOLUTION

Umit Tarakci, Oxnard, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed May 5, 1976, Ser. No. 683,553
Int. Cl.[2] G03C *5/00*
U.S. Cl. 96—36 **25 Claims**

1. An improvement in a method for providing a metallization pattern on a substrate, which method includes depositing a photoresist layer on the substrate;

photographing a pattern on the layer;
developing the exposed layer and removing portions of the layer to expose the substrate underneath;
metallizing the remaining portion of the photoresist layer as well as the exposed substrate; and
dissolving the said remaining portions of the photoresist layer in a photoresist-solving agent, while lifting off the metallization thereon, the improvement comprising the additional step of
lubricating the metallization as well as any portion of the substrate which becomes exposed upon dissolution of the photoresist material during the lifting step utilizing glycerine added to said photoresist-solving agent, so tht lubricated metallization flakes will be prevented from adhering to the substrate.

4,042,388

PROCESS FOR THE PREPARATION OF SENSITIZED MATERIAL FOR ELECTROPHOTOGRAPHY

Eiichi Inoue; Ichiro Endo, both of Tokyo, and Teruo Yamanouchi, Fujisawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 234,988, March 15, 1972, abandoned, which is a continuation of Ser. No. 858,539, Sept. 16, 1969, abandoned. This application Apr. 2, 1973, Ser. No. 347,075
Int. Cl.[2] G03G *5/06*
U.S. Cl. 96—1.6 **7 Claims**

1. A process for producing a sensitized photosensitive material for electrophotography which comprises applying radiation to a solution of an organic photoconductive substance, a

free radical former and a dye base said radiation being capable of generating free radicals from said free radical former.

4,042,389

METHOD OF RECORDING IMAGE ON LENTICULATED MICROFICHE

George J. Yevick, Leonia, N.J., assignor to Personal Communications, Inc., Stamford, Conn.

Division of Ser. No. 474,790, May 30, 1974, Pat. No. 3,967,289. This application July 9, 1975, Ser. No. 594,350
Int. Cl.[2] G03C 5/04
U.S. Cl. 96—27 R 6 Claims

1. A method of recording optical intelligence on a microfiche for subsequent readout, the microfiche including a transparent support coated with a photographic emulsion on one surface thereof, the other surface of the microfiche carrying a plurality of lenses integral with the transparent support, the improvement comprising, the step of directing optical intelligence onto discrete, spaced apart regions on said emulsion from the emulsion side of said microfiche, without passing through the transparent support, each said discrete region optically aligned with one of said integral lenses.

4,042,390

CATHODE RAY STORAGE TUBE HAVING A TARGET DIELECTRIC PROVIDED WITH COLLECTOR ELECTRODE SEGMENTS EXTENDING THERETHROUGH

Edward R. Steele, Beaverton, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Division of Ser. No. 599,620, July 28, 1975, Pat. No. 3,978,366. This application May 27, 1976, Ser. No. 690,450
Int. Cl.[2] G03C 5/00
U.S. Cl. 96—36.1 3 Claims

1. A method of fabricating a storage target for use in conjunction with a cathode ray tube comprising the steps of:

applying a layer of photopolymerizable material having a dispersion of glass beads and vitreous frit therethroughout onto a surface of a dielectric support member;

transmitting light through a pattern of openings in a photomask which activates the photopolymerizable material to polymerize same in the areas the light engages;

washing the photopolymerizable material which removes the material not polymerized and leaving in position a pattern of segments of glass beads and vitreous frit baking the dielectric support member and pattern of segments of glass beads and vitreous frit with said vitreous frit securing the glass beads together and in position on said surface of said dielectric support member;

depositing a coating of conductive material onto said surface and said pattern of secured glass bead segments;

applying a layer of photopolymerizable material having phosphor particles dispersed therein onto said conductive coating and conductively-coated glass bead segments;

transmitting light into said photopolymerizable material with said light activating the photopolymerizable material in the areas to polymerize same except where said conductively-coated glass bead segments are located; and

washing the photopolymerizable material which removes the material not polymerized and leaving in position layer means of phosphor.

4,042,391

PROCESS FOR FORMING VESICULAR PHOTOGRAPHIC IMAGES BY EMPLOYING SIMULTANEOUS ACTINIC LIGHT AND INFRA-RED REFLEX EXPOSURE

Hideo Fukutani, Tokyo; Hiroshi Oba; Akane Okada, both of Yokohama, and Atsuko Shimizu, Tokyo, all of Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Filed Apr. 24, 1975, Ser. No. 571,051
Claims priority, application Japan, Apr. 25, 1974, 49-46882; July 24, 1974, 49-84894; Sept. 18, 1974, 49-107339
Int. Cl.[2] G03C 5/10, 5/20
U.S. Cl. 96—47 9 Claims

1. A process for forming a vesicular image which is the same sign as that of the original, which comprises contacting an original with a supported vesicular photographic element comprising a photosensitive material which generates a gas when irradiated by light to which it is sensitive, said material dispersed or dissolved in a thermoplastic or thermosettable resin, wherein the vesicular photographic element while in contact with the original is reflex exposed simultaneously to both infrared rays and light of wavelengths to which said photosensitive material is sensitive through the vesicular element to the original so as to effect decomposition of the photosensitive marerial to generate a gas and formation of the vesicular image simultaneously.

4,042,392

FORMAZAN IMAGES BY PHYSICAL DEVELOPMENT OF CATALYTIC METAL NUCLEI IMAGE

Henry James Gysling, and Mark Lelental, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 14, 1975, Ser. No. 567,667
Int. Cl.[2] G03C 5/24, 1/40
U.S. Cl. 96—48 PD 17 Claims

1. A process of preparing a formazan dye image comprising forming an image comprising nuclei of one or more metals from Groups VIIIB and/or IB of the periodic table and catalytically reducing a terazolium salt in contact with said nuclei, a reducing agent that does not spontaneously reduce said tetrazolium salt.

2. A process of preparing a formazan dye image comprising imagewise exposing to electromagnetic radiation a photographic element comprising a photographic layer comprising one or more light sensitive complexes of metals from Groups VIIIB and/or IB of the periodic table to form a latent image of catalytic metal nuclei in said layer and catalytically reducing a tetrazolium salt in contact with said nuclei, a reducing agent that does not spontaneously reduce said tetrazolium salt or said light sensitive complexes.

14. A photographic element comprising a photosensitive layer comprising one or more light sensitive complexes of metals from Group VIIIB and/or IB of the periodic table said complexes being capable of forming catalytic metal nuclei on exposure, to electromagnetic radiation and a layer comprising a tetrazolium salt said layers being in reactive association.

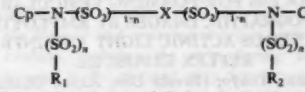
4,042,393

SILVER HALIDE EMULSION CONTAINING TWO EQUIVALENT TYPE COUPLER FOR USE IN PHOTOGRAPHY

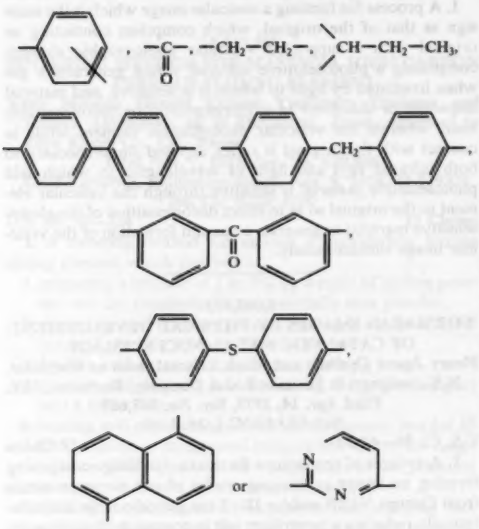
Hajime Wada; Shouji Kikuchi; Haruo Hori, and Takaya Endo, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 482,748, June 24, 1974, abandoned. This application Sept. 22, 1975, Ser. No. 615,825
Claims priority, application Japan, June 22, 1973, 48-69866
Int. Cl.[2] G03C 7/00, 1/40
U.S. Cl. 96—55 7 Claims

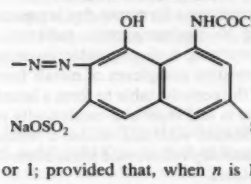
1. A method for developing an exposed silver halide color photosensitive material which comprises conducting the development in the presence of the following compound:



wherein C_p is a phenol or naphthol cyan coupler residue haing one hydrogen atom removed from the active methylene of said coupler; R_1 and R_2 are individually hydrogen, halogen, and aliphatic hydrocarbon residue, carbamoyl, aromatic hydrocarbon residue, cyano, formyl and acyl; X is pyridyl, quinolyl, thiethyl, piperidyl, imidazolyl, oxydiazolyl,



which can be substituted with methyl, nitro, hydroxyl, or



and n is 0 or 1; provided that, when n is 1, X is a carbonyl group.

4,042,394

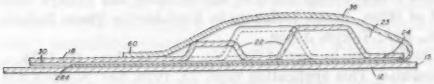
PHOTOGRAPHIC DYE IMAGE STABILIZATION

Wendell F. Smith, Jr., Fairport; Kenneth L. Eddy, Canadaigua, and Donald P. Harnish, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 357,563, May 7, 1973, abandoned. This application Feb. 3, 1975, Ser. No. 546,659

Int. Cl.[2] G03C *7/00*

U.S. Cl. 96—56 **27 Claims**



1. A method of forming an image having improved stability in a photographic element containing a photosensitive silver halide emulsion layer, comprising

associating in the element (i) a photographic coupler capable of reacting with the oxidized form of a pre-selected primary aromatic amine developing agent to form an imaging dye having an absorption peak below 590 nm, and (ii) a photographic coupler capable of reacting with the oxidized form of the pre-selected developing agent to form an azomethine dye having an absorption peak above 700 nm,

imagewise exposing the element,

developing the element with the pre-selected developing agent to form the imaging dye and the azomethine dye.

4,042,395

INTEGRAL FILM UNIT WITH INTERMEDIATE SHEET FORMING A FLUID RESERVOIR WITH ONE END PORTION THEREOF

Frederick F. Tone, Holley, N.Y., and Robert J. Borel, Columbus, Ohio, assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 570,898, April 23, 1975, abandoned. This application Apr. 28, 1975, Ser. No. 572,541

Claims priority, application United Kingdom, May 6, 1974, 19880/74

Int. Cl.[2] G03C *1/48*; G03D *9/02*

U.S. Cl. 96—76 C **24 Claims**

1. In a photographic film unit having lateral and transverse edges comprising a first sheet having thereon a layer of photosensitive material capable of recording an image when exposed to actinic radiation, a second sheet arranged in superposition with said first sheet with said photosensitive layer located between said sheets, and a container carrying a quantity of a fluent processing composition, said container having a discharge passage adapted to be opened in response to generation of pressure within said composition to discharge said composition from said container to between the sheets, the improvement comprising:

an intermediate sheet disposed between said first and second sheets and coupled to both of them at the lateral marginal portions thereof and separating said lateral marginal portions by a predetermined amount; and

said intermediate sheet having an end portion extending from between said first and second sheets at one end thereof and being folded around that end of one of said first and second sheets to overlie the outside surface thereof, said end portion of said intermediate sheet being coupled to the outside surface of said one sheet to form a fluid receiving reservoir between said folded around portion of said intermediate sheet and said outside surface of said one sheet.

4,042,396

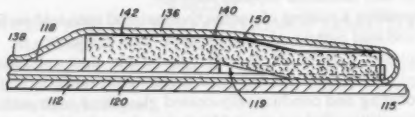
FLUID RECEIVING TRAP WITH AIR RELEASING MEANS COMPRISING A PROCESSING COMPOSITION IMPERVIOUS LAYER

Robert A. Sylvester, Hilton, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed July 11, 1975, Ser. No. 595,451

Int. Cl.[2] G03C *1/48*; G03D *9/02*

U.S. Cl. 96—76 C **8 Claims**



1. In a film unit comprising a photosensitive sheet and a second sheet, means securing the sheets together in superposed relationship, means for containing a processing composition disposed at one end of the film unit, and means for trapping excess processing composition disposed at the other end of the film unit, said trapping means comprising trap spacing means,

trap cover means of sheet material overlying the spacing means, and trap venting means comprising a plurality of holes through said trap cover means, the improvement comprising:

processing-composition-impervious means disposed between said trap spacing means and said holes through said trap cover means.

4,042,397

LIGHT-ABSORBING DYE FOR USE IN PHOTOGRAPHY

Felix Jan Moelants, Wilrijk; Jozef Aimé Dierckx, Hove, and Henri Depoorter, Mortsel, all of Belgium, assignors to AGFA-GEVAERT N.V., Morstel Belgium

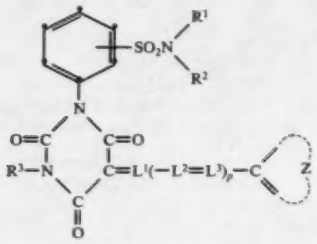
Filed Apr. 12, 1976, Ser. No. 676,007

Claims priority, application United Kingdom, Apr. 30, 1975, 18068/75

Int. Cl.[2] G03C *1/84*

U.S. Cl. 96—84 R 13 Claims

1. A light-sensitive photographic element comprising a support, at least one light-sensitive silver halide emulsion layer and a colloid layer containing a dye corresponding to the formula :



wherein :

Z represents the atoms necessary to form :

1. a barbituric acid nucleus so that a symmetrical oxonol dye is obtained,
2. a phenyl group so that a benzylidine or cinnamylidene dye is obtained, or
3. a pyrrole ring,

each of L^1, L^2 and L^3 represents a methine group,

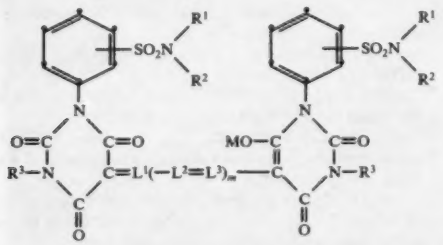
p represents 0 for Z having significance (3), 0 or 1 for Z having significance (2), or 1 or 2 for Z having significance (1),

R^3 represents an aliphatic or aromatic hydrocarbon group,

R^1 represents hydrogen, an alkyl group, an acyl group or an amino group, and

R^2 represents hydrogen, an alkyl group or an aryl group, or R^1 together with R^2 represents the atoms necessary to complete a heterocycle.

6. An element according to claim **1**, wherein the dye corresponds to the formula :



wherein :

m represents 1 or 2,

R^1, R^2, R^3, L^1, L^2 and L^3 are defined as in claim **2**, and M is a cation.

4,042,398

POLYOLEFIN COATED PHOTOGRAPHIC BASE AND METHOD OF PRODUCING

Peter H. Holm, Osnabrueck, Germany, and William L. Quartz, Pulaski, N.Y., assignors to Schoeller Technical Papers, Inc., Pulaski, N.Y.

Filed Oct. 20, 1975, Ser. No. 623,679

Int. Cl.[2] G03C *1/86*

U.S. Cl. 96—85 24 Claims

1. A process for the preparation of a photographic base comprising the steps of

a. applying an aqueous coating composition to at least one surface of a paper substrate, said coating composition containing aluminum oxide particles, said aluminum oxide particles having a particle size of from about 1 millimicron to about 60 millimicrons,

b. drying said coated substrate,

c. applying a molten film of a polyolefin over at least one of said coated surfaces of said coated substrate,

d. adhering said polyolefin film to said coated surface, and

e. cooling said polyolefin film to a temperature below the melt point of said polyolefin.

4,042,399

PHOTOGRAPHIC ELEMENT WITH IMPROVED SLIP

Günther Kiesslich, Dietzenbach, Germany, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed July 15, 1975, Ser. No. 596,192

Claims priority, application Germany, July 26, 1974, 2435983

Int. Cl.[2] G03C *1/78, 1/96, 1/76*

U.S. Cl. 96—87 R 13 Claims

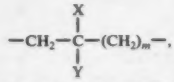
1. In a photographic film comprising a film support and a photosensitive silver halide emulsion layer on at least one side of said support, the improvement wherein at least one outer layer of said photographic film is a dispersion of a polyester slip agent in gelatin in an amount of 0.1 to 50 grams per 100 grams of gelatin, said polyester slip agent having repeating units of the formula:

$$-O-CO-(CH_2)_n-CO-O-R-$$

in which:

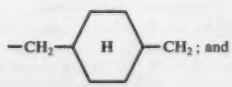
n = 1–8, and R is a member selected from the group consisting of

(a)



wherein m = 0–4, and X and Y are each selected from the group consisting of H and $-CH_3$;

(b)



c. $-C_2H_4-O-C_2H_4-$.

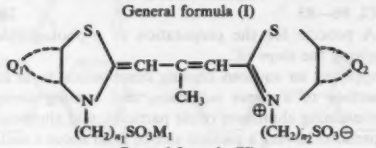
4,042,400
LIGHT-SENSITIVE SILVER HALIDE PHOTOGRAPHIC MATERIAL

Shigeji Baba; Bunji Okubo, and Eiichi Sakamoto, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

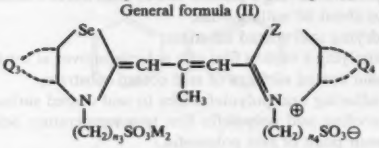
Filed Jan. 12, 1976, Ser. No. 648,743
Claims priority, application Japan, Jan. 14, 1975, 50-7208
Int. Cl.² G03C *1/14*
U.S. Cl. 96—124 **5 Claims**

1. A light-sensitive silver halide photographic material comprising a silver halide emulsion containing a compound having the below-mentioned general formula (I) and a compound having the below-mentioned general formula (II),

General formula (I)



General formula (II)



wherein Q_1, Q_2, Q_3 and Q_4 are individually a non-metal atom grouping necessary to complete an unsubstituted or alkyl-, alkoxyl-, phenyl-, hydroxyl-, carboxyl- or halogen-substituted benzene ring, or a non-metal atom grouping necessary to complete a naphthalene ring; Z is a sulfur or selenium atom; n_1, n_2 n_3 and n_4 are individually 2, 3 or 4; and M_1 and M_2 are individually a hydrogen atom, an alkali metal atom or H-Q (where Q is an organic base).

4,042,401
HECTOGRAPH PRODUCTS AND PROCESS

Douglas A. Newman, Glen Cove, and Robert T. Emerson, Manhasset, both of N.Y., assignors to Columbia Ribbon and Carbon Manufacturing Co., Inc., Glen Cove, N.Y.

Continuation-in-part of Ser. No. 312,736, Dec. 6, 1972, abandoned. This application Feb. 26, 1975, Ser. No. 553,134
Int. Cl.² B41M *1/12*; C09K *3/00*
U.S. Cl. 106—14.5 **9 Claims**

1. Thixotropic semi-solid hectograph printing ink which is substantially free of dissolved hectograph coloring matter comprising from about 30% to 80% by weight of a liquid vehicle consisting of at least one volatile organic liquid vehicle having a boiling point between about 200° F and 460° F and having a solids content of from about 70% to 20% by weight comprising:

a. from about 50% to 85% by weight of the solids content of dispersed, finely-divided, undissolved spirit-soluble hectograph coloring matter which is substantially completely insoluble in said liquid vehicle,
b. from about 5% to 20% by weight of the solids content of dispersed, finely-divided, hard wax particles having a melting temperature between about 140° F and 300° F,
c. from about 2% to 15% by weight of the solid content of film-forming binder material which is at least partially soluble in said liquid vehicle, the weight of said film-forming binder material present being less than the weight of said hard wax particles present in said ink, and
d. from about 5% to 20% by weight of the solids content of a non-drying, semi-solid, oleaginous material which is at least partially incompatible with the hard wax and which has a melting point below about 185° F, substantially all of the dispersed solids in said ink being less than 10 microns in size and said ink being capable of being printed and dried and fused at elevated temperatures to provide a clean, rub-resistant, stable duplicating composition.

4,042,402
BIOCIDAL GLASS MATERIALS

Cyril Francis Drake, Harlow, and Robert Walter James Amos, New Barnet, both of England, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Dec. 31, 1975, Ser. No. 645,484
Claims priority, application United Kingdom, Jan. 7, 1975, 600/75
Int. Cl.² C09D *5/14*; C03C *3/14, 3/30*
U.S. Cl. 106—15 R **1 Claim**

1. In a $CuO—B_2O_3—Al_2O_3$ glass anti-foulant of the type used for the controlled release of liquid soluble metal ions into solution in seawater, the improvement wherein: the molar ratio of CuO to B_2O_3 is from about 2 to 1 to about 1 to 1, the remainder is Al_2O_3 at about 5 mole percent to provide a dissolution rate of about 0.02 to 0.06 milligrams per hour per square centimeter of copper ions on contact with seawater.

4,042,403
THERMALLY STABLE GLASS-CERAMIC ARTICLES

Richard F. Reade, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed May 19, 1975, Ser. No. 578,379
Int. Cl.² B26B *7/28*; C03B *32/00*
U.S. Cl. 106—39.7 **3 Claims**

1. A method for making a glass-ceramic article exhibiting an average coefficient of thermal expansion (R.T. to 1000° C.) between about 0–15 × 10^{-7}/° C. and a change in length of less than about 1000 PPM after an exposure of 2000 hours to temperatures up to 950° C. consisting essentially of a fine-grained crystal phase uniformly dispersed within a glassy matrix, said crystal phase being essentially free from cristobalite, cordierite, and spinel and consisting essentially of beta-spodumene solid solution, said crystals constituting at least 90% by volume of the article which comprises:

a. melting a batch for a glass consisting essentially, by weight on the oxide basis, of about 3–5% Li_2O, 0.25–2.5% MgO, 15–20% Al_2O_3, 68–75% SiO_2, and 2–5.5% TiO_2, wherein the molar ratio of Li_2O:MgO is at least 2:1;
b. simultaneously cooling the melt to at least within the transformation range and shaping a glass article of a desired configuration therefrom;
c. heating said glass article to a temperature between about 1050°–1250° C. to cause the crystallization in situ of beta-spodumene solid solution crystals; and then
d. cooling the crystallized article to room temperature.

3. A glass-ceramic article made in accordance with the method of claim **1**.

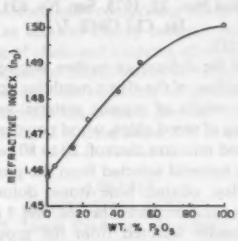
4,042,404
FUSED P_2O_5 TYPE GLASSES

Peter C. Schultz, Painted Post, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Continuation-in-part of Ser. No. 321,109, Jan. 4, 1973, abandoned. This application Apr. 12, 1976, Ser. No. 675,959

Int. Cl.[2] C03C *3/04; C03B 25/00, 23/20*

U.S. Cl. 106—52 **2 Claims**



1. A method for making a transparent fused oxide type glass exhibiting a refractive index between about 1.46–1.49 and a coefficient of thermal expansion (0°–300° C.) of about 5–40 $\times$ 10^{-7}/° C. consisting essentially, by weight, of 2–50% P_2O_5 and the remainder SiO_2, and having a cation impurity level not exceeding 10 PPM, which comprises the steps

a. entraining a vaporizable compound capable of being converted by flame hydrolysis and decomposition to P_2O_5 and a vaporizable compound capable of being converted by flame hydrolysis and decomposition to SiO_2 in a gas stream;

b. passing said gas stream into the flame of a combustion burner to cause the interbonding of P_2O_5 and SiO_2 into vitreous particles of fused P_2O_5—SiO_2 such that volatilization of P_2O_5 and SiO_2 is limited;

c. collecting said vitreous particles at a temperature below the minimum consolidation temperature as a porous preform body; and then

d. heating said porous preform body to a temperature within the range of minimum consolidation temperature of said vitreous particles and 200° C. thereabove, but not in excess of 1450° C., to consolidate said porous preform body to a non-porous glass body.

2. A fused oxide type glass produced in accordance with claim **1.**

4,042,405
HIGH STRENGTH OPHTHALMIC LENS

David A. Krohn; Robert E. Graf, both of Southbridge, Mass., and Emil W. Deeg, Woodstock, Conn., assignors to American Optical Corporation, Southbridge, Mass.

Filed Mar. 18, 1976, Ser. No. 668,174

Int. Cl.[2] C03C *21/00, 3/04, 3/30*

U.S. Cl. 106—52 **3 Claims**

1. A chemically-strengthened ophthalmic glass lens made from a phospho-silicate glass having the following chemical analysis:

Ingredient	Percent by Weight
sodium oxide	about 4 to about 15
potassium oxide	about 3 to about 15
Other Alkali Metal Oxides:	
lithium oxide	up to about 5
rubidium oxide	up to about 5
cesium oxide	up to about 5
lanthanum oxide	up to about 15
aluminum oxide	up to about 5
zirconium oxide	up to about 5
zinc oxide	up to about 15
calcium oxide	up to about 10
titanium oxide	up to about 5
magnesium oxide	up to about 4
boron oxide	up to about 2
phosphorus pentoxide	about 3 to about 15
Total Na_2O + K_2O and other alkali metal oxides	about 12 to about 20
Total ZnO + La_2O_3 + CaO + MgO	about 8 to about 15
Total MgO + Al_2O_3	about 0.2 to about 5
Fining Agents (antimony oxide, cerium oxide, arsenic oxide and mixtures thereof)	up to about 2
silica	balance

said lens characterized by an index of refraction in the range of about 1.50 to 1.52 having a minimum depth of penetration of potassium ions of 120 microns and a compressively-stressed surface layer having a strength of at least 25,000 psi.

4,042,406
BUILDING MATERIAL

Benjamin Gray, 167 Grandview Ave., Nanuet, N.Y. 10954

Continuation-in-part of Ser. No. 606,375, Aug. 20, 1975, abandoned. This application Sept. 8, 1976, Ser. No. 721,618

Int. Cl.[2] C04B *7/02*

U.S. Cl. 106—88 **9 Claims**

1. In the process of producing an extra lightweight concrete block for non-load bearing interior partitions of buildings consisting of intermixing portions of a single aggregate, expanded perlite, with cement in a mixing machine, and gradually adding water thereto while mixing the same until the required amount of water has been supplied, the improvement which consists in using a single aggregate, expanded perlite, and in adding to the preceding mixture 50% solids concentrate of triethanolamine salt of P-dodecyl benzene sulfonic acid and 50% water and continuing the mixing until a tractable mixture is obtained, after which the mixture is fed into a block forming machine.

4,042,407
HYDRAULIC COMPOSITION

Tadao Natsuume, Yokosuka, Japan, assignor to Nippon Zeon Co., Ltd., Tokyo, Japan

Filed July 15, 1975, Ser. No. 596,150

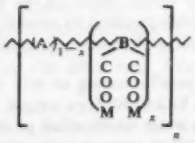
Claims priority, application Japan, July 17, 1974, 49-81870; Mar. 4, 1975, 50-26197

Int. Cl.[2] C04B *7/35*

U.S. Cl. 106—90 **22 Claims**

1. A hydraulic composition comprising 100 parts by weight of a hydraulic substance and as a water-reducing admixture 0.01 to 2.0 parts by weight of a water-soluble polymer, said polymer being selected from the group consisting of:

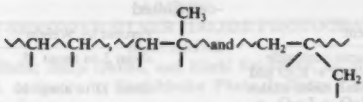
1. the water-soluble olefin-ethylenically unsaturated dicarboxylic acid salt copolymers represented by the following structure:



wherein

A is an olefin unit selected from the group consisting of an acyclic olefin having 5 to 6 carbon atoms, a cyclic olefin having 5-10 carbon atoms and derivatives of said cyclic olefin,

B is selected from the group consisting of



M is selected from the group consisting of an alkali metal atom, an alkaline earth metal atom and ammonium ion,

x is from 0.4 to 0.6, and

n is an integer from 2 to 300; and

2. derivatives of said copolymer wherein M in the copolymer is replaced by an alkyl group having 1–8 carbon atoms in an amount of not more than 30% thereof.

4,042,408

HYDRAULIC CEMENTS

Ransom James Murray, Gravesend, and Arthur William Brown, London, both of England, assignors to The Associated Portland Cement Manufacturers Limited, England

Filed Apr. 5, 1976, Ser. No. 674,034

Claims priority, application United Kingdom, Apr. 17, 1975, 15878/75

Int. Cl.[2] C04B *7/02*

U.S. Cl. 106—100 **30 Claims**

1. In a method of making a high strength cement of the Portland type wherein argillaceous and calcareous materials are combined to form clinker by heating in a kiln and the resulting clinker is ground to form a cement, the improvement wherein the hydraulic activity attributable to the alite content is improved by introducing into the kiln a combination of mineralisers which contains fluorine and sulphur in which the mineralisers contain 0.1 to 2.0 percent fluorine by weight and 1 to 10 percent SO_3 by weight based on the clinker, provided that an alkali metal compound which can be a component of the aforesaid combination of mineralisers is included so that at least 0.5 percent sulphate is retained in the clinker as alkali metal sulphate at least when the condition that the lime saturation factor be at least 0.98 and the silica ratio be at least 4 is not met.

4,042,409

WATER REPELLENT GYPSUM COMPOSITION

Ichiro Terada, Kamakura; Tadashi Yamada, Tokyo; Michio Nishi, Tokyo; Mitsuo Uchida, Tokyo; Naomasa Sugiyama; Mamoru Kaneko, both of Yokohama, and Nobuhiko Takeda, Kawasaki, all of Japan, assignors to Mitsubishi Chemical Industries Limited and Yoshino Gypsum Co., Ltd., both of Tokyo, Japan

Filed Apr. 1, 1976, Ser. No. 672,540

Claims priority, application Japan, Apr. 3, 1975, 50-41041

Int. Cl.[2] C04B *11/14*

U.S. Cl. 106—111 **11 Claims**

1. A water repellent gypsum composition, which consists essentially of:

a mixture of 100 parts by weight of a gypsum material per 1–20 parts by weight based on the solids content of a paraffin emulsion prepared by emulsifying

A. a paraffin hydrocarbon having a melting point of 40°–80° C and

b. an oxidized paraffin having an acid value of 10–70 at a ratio of from 97:3 to 50:50 by weight, respectively in the presence of a water soluble alkali or ammonium ion base.

6. A water repellent gypsum composition, which consists essentially of:

a mixture of said gypsum, and said paraffin emulsion of claim **1** and a polymer emulsion or solution, wherein the weight ratio of the solid components of said paraffin emulsion to said polymer emulsion or solution ranges from 95:5 to 40:60, and wherein said polymer of said polymer emulsion is an acrylic acid ester polymer, a vinyl acetate homopolymer or copolymer, a urea polymer or an asphalt emulsion.

4,042,410

METHOD FOR DEFOAMING MOLTEN SLAG

Haruo Ito, Imaichi, Japan, assignor to Aikoh Co., Ltd., Tokyo, Japan

Filed Nov. 12, 1975, Ser. No. 631,068

Int. Cl.[2] C04B *7/14*

U.S. Cl. 106—117 **3 Claims**

1. A method for defoaming molten slag by throwing onto the bubbling surface of the slag a moulding consisting of 17 to 72 percent by weight of organic material selected from the group consisting of wood chips, wood powder, rice hulls, coal, tar and pitch and mixtures thereof; 20 to 80 percent by weight of a refractory material selected from the group consisting of silica, grog, clay, olivine, lime stone, dolomite, magnesite, bauxite, alumina and mixtures thereof; and 3 to 15 percent by weight of a binder selected from the group consisting of starches, resins, sugars, proteins, water glass, aluminum phosphate, colloidal silica and mixtures thereof, whereby said moulding disintegrates to cause bubbles present in said molten slag to dissipate.

4,042,411

METHOD OF PROCESSING FOOD PARAFFINS AND USES OF OBTAINED PRODUCTS

Ljudmila Petrovna Kazakova, ulitsa Butlerova, 20, kv. 277; Alexei Alexandrovich Gundyrev, Leninsky prospekt, 69, korpus 2, kv. 280, both of Moscow; Nina Yakovlevna Rudakova, ulitsa Krylova, 22, kv. 10, Lvov; Fridrikh-Leopold Khaskelevich Sharf, ulitsa Zhupnaya, 11, kv. 3; Yaroslav Evstavievich Garun, ulitsa Zhupnaya, 27, both of Drogobych Lvovskoi oblasti; Lidia Ivanovna Belyashina, ulitsa Nagornaya, 33, korpus 22, kv. 52, Moscow, and Zoya Vasilievna Kocheva, ulitsa Gogolya, 1, kv. 30, Drogobych Lvovskoi oblasti, all of U.S.S.R.

Filed Apr. 22, 1975, Ser. No. 570,424

Int. Cl.[2] C08L *91/08*

U.S. Cl. 106—270 **2 Claims**

1. A method of processing food paraffins into a mixture of paraffins of normal structure, iso-structure, and naphthenes with side chains of normal structure and iso-structure, containing from 20 to 32 carbon atoms, and high-melting paraffins of normal structure, which comprises reacting a food paraffin at a temperature of 42°–45° C with carbamide taken in the weight ratio of 1.1, in the presence of a solvent consisting of 60 percent by volume of benzine and 40 percent by volume of acetone, taken in the paraffin:solvent weight ratio of 1:3–3.5, thus forming a reaction mixture consisting of a crystalline mass containing high-melting paraffins of normal structure in the form of their complex with carbamide, and of a solution of a mixture of paraffins of normal structure, iso-structure, and naphthenes with side chains of normal and iso-structure, containing from 20 to 32 carbon atoms, in said solvent; separating said crystalline mass and the solution of said mixture; washing the solution of said mixture with water at a temperature of 80°–90° C and removing the solvent and water by distillation, the thus obtained mixture of paraffins of normal structure, iso-structure and naphthenes with side chains of normal and iso-structure being useful as an additive to protective coatings for canning tins; mixing said crystalline mass with water at a temperature of 80°–90° C to form an aqueous solution of carbamide and a solution of high-melting paraffins of normal structure, in said solvent; separating said solutions, and removing the solvent from the solution of high-melting paraffins of normal stucture by distillation.

4,042,412
HIGH SOLIDS CONTENT ACTIVE CLAY COATING FORMULATIONS AND METHODS FOR PRODUCING AND APPLYING THE SAME

Rodney E. Williams, Williamsville, N.Y., assignor to Moore Business Forms, Inc., Niagara Falls, N.Y.

Filed June 20, 1975, Ser. No. 588,800
Int. Cl.² C09C *1/42*; B41M *5/22*
U.S. Cl. 106—306 **11 Claims**

1. A coatable formulation comprising water, an active bentonite-type clay, an inactive clayey material selected from the group consisting of chalk and mixtures of chalk and kaolin and a binder, said inactive clayey material being present in the formulation in an amount sufficient to provide a total solids content in the formulation of from about 43 to about 60% by weight and a viscosity of from about 700 to about 7,000 cps.

4,042,413
DISPERSING AGENTS

Frank Hauxwell; James Frederick Stansfield, and Arthur Topham, all of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 330,882, Feb. 8, 1973, abandoned. This application Dec. 11, 1974, Ser. No. 531,787
Claims priority, application United Kingdom, Feb. 28, 1972, 9033/72
Int. Cl.² C08J *3/20*; C09B *67/00*; C09C *3/08*; C09D *3/00*
U.S. Cl. 106—308 N **7 Claims**

1. Compositions of matter comprising a finely divided dispersion containing between 5 and 70% by weight based on the total weight of the composition of a solid dyestuff or pigment in an inert liquid hydrocarbon or an inert chlorinated hydrocarbon containing dissolved therein between 5% and 100% by weight based on the weight of the pigment or dyestuff of a dispersing agent which is an adduct of 80:20 mixture of 2:4 and 2:6 diisocyanatotoluent, 1:6 hexanediol and a compound of the formula:

Z—X—E—Q

wherein

Z represents —OH;

X is a divalent aliphatic hydrocarbon, or a chloro substituent thereof, containing from 10 to 17 carbon atoms;

Q is alkyl or alkenyl containing from 12 to 18 carbon atoms or a hydroxy substituent thereof; and

E is

4,042,414
PROCESSING OF STARCH

Kenneth Justin Goering, and Robert Freeman Eslick, both of Bozeman, Mont., assignors to Research Corporation, New York, N.Y.

Filed Sept. 17, 1974, Ser. No. 506,759
Int. Cl.² C13L *1/08*
U.S. Cl. 127—32 **8 Claims**

1. A method for the simultaneous production of a waxy, small granule starch of high spreadability, and a large granule, waxy starch which is capable of forming an exceptionally clear and bright paste, which comprises:

a. steeping waxy barley grain for a period of at least 12 hours in an aqueous solution containing sulfur dioxide at a temperature of 45°–55° C so as to swell the grain and extract soluble protein contained within said grain,

b. water washing and milling said steeped grain,

c. separating fiber and protein from the starch granules in said grain,

d. suspending said starch granules in water to form a suspension containing less than 15% wt solids,

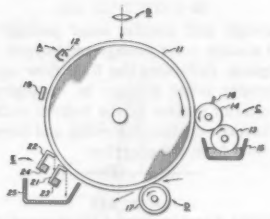
e. permitting larger granules to settle for a period of at least 2 hours and recovering a larger granule fraction, said larger granules being characterized by an average particle size of greater than 10μ, and

f. breaking the remaining suspension and recovering therefrom a smaller granule fraction, said small granules being characterized by an average particle size of from 2.5 to 10μ.

4,042,415
METHOD FOR SCRAPING LIQUIDS FROM A MOVING SURFACE

Stephen C. P. Hwa, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 473,535, May 28, 1974, Pat. No. 3,918,807. This application July 23, 1975, Ser. No. 598,446
Int. Cl.² B08B *1/02*
U.S. Cl. 134—6 **1 Claim**



1. A method of deflecting liquid developer from a support surface movable in a given direction comprising engaging at least two scraper blades in succession in contact with the uphill portion of the support surface, so that a second scraper blade is downstream from a first scraper blade, at least the first scraper blade having an upper stem portion extending opposite said given direction to a point of contact of the upper stem portion with said surface, said point of contact on the upper stem portion being a cutting tip, and a lower stem portion extending towards the upper stem portion in said given direction until it intersects and forms an angle with the upper stem portion, the upper portion having a drip tip adjacent the point of contact of the upper stem portion with said surface; and moving the support surface in a given direction, whereby both blades scrape liquid developer from the support surface, and liquid developer accumulated by said second scraper blade collects at the downstream side of said first scraper blade and is removed by flowing over the lower stem portion of said first scraper blade.

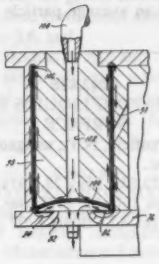
4,042,416
METHOD FOR TREATING CUP-SHAPED WORKPIECES

Peter Miskech, Warren, Mich., assignor to Oxy Metal Industries Corporation, Warren, Mich.

Division of Ser. No. 572,166, April 28, 1975, Pat. No. 3,969,136. This application Mar. 17, 1976, Ser. No. 667,574
Int. Cl.² B08B *3/02, 7/04*
U.S. Cl. 134—10 **4 Claims**

1. A method of treating the surfaces of cup-shaped workpieces each comprising a cylindrical side wall closed at one of its ends by a bottom wall which comprises the steps of positioning a shape conforming nozzle within the interior of each workpiece in clearance-spaced relationship relative to the interior surface of the side wall and bottom wall thereof and enclosing the exterior of the workpiece within a chamber disposed in clearance-spaced relationship to the exterior surface of the side wall thereof in a manner to define in combination with the walls of the workpiece a communicating radial

passage, annular inner passage and annular outer fluid flow passage; discharging a high pressure fluid from the inner end of said nozzle against the central portion of the interior surface of the bottom wall of the workpiece to effect a high velocity radial outward flow of said fluid across the interior bottom surface thereof through said radial passage and sequentially



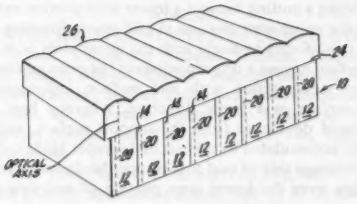
into and through said annular inner passage and into and through said annular outer passage and beyond the closed end of the workpiece, deflecting the fluid flow upon emergence from the annular outer passage in impinging relationship against the exterior surface of the bottom wall of the workpiece and in intimate contact therewith, and thereafter draining the treating fluid from the chamber.

4,042,417

PHOTOVOLTAIC SYSTEM INCLUDING A LENS STRUCTURE

Roy Kaplow, Newton, and Robert I. Frank, Cambridge, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed May 26, 1976, Ser. No. 690,056
Int. Cl.[2] H01L *31/06*
U.S. Cl. 136—89 PC **10 Claims**



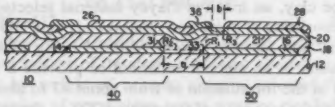
1. Photovoltaic means for producing an electrical output from incident solar radiation, said photovoltaic means comprising a plurality of unit semiconductor solar cells each having at least one p-n junction, said p-n junctions being arranged in planes lying substantially parallel to the direction of the incoming radiation on the light-receiving surfaces of said cells, and optical radiation-focussing means comprising a corresponding plurality of optical elements having their optical axes arranged in spaced parallel relation in planes parallel to the planes of said p-n junctions, said optical axes being spaced by a distance substantially equal to *n* times half of the width of each of said unit solar cells, where *n* is an integer of one or two, each of said optical axes being respectively offset with respect to the planes of said p-n junctions, said radiation-focussing means thereby being effective to focus incident radiation onto said light-receiving surfaces as spaced narrow beams which are parallel to, and in primary adjacency to but offset from the planes of each of said p-n junctions, whereby radiation incident upon said light-receiving surface is directed essentially in the vicinity of each of said p-n junctions.

4,042,418

PHOTOVOLTAIC DEVICE AND METHOD OF MAKING SAME

William J. Biter, Murrysville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 2, 1976, Ser. No. 710,971
Int. Cl.[2] H01L *31/06*
U.S. Cl. 136—89 P **6 Claims**



1. A photovoltaic device comprising:
a substrate;
at least first and second conductors spaced apart on said substrate, said conductors having adjacent facing edges;
a layer of a first semiconductor material overlying said conductors and said substrate between said adjacent facing edges;
a layer of a second semiconductor material overlying said first semiconductor layer and forming a photovoltaic junction with said first semiconductor layer;
current conducting means disposed on said second semiconductor layer over said first conductor, said current conducting means extending to a point in operative proximity to said adjacent facing edge of said second conductor; and
means for providing a low resistance path between said current conducting means and said second conductor through said second semiconductor layer, said low resistance path means disposed above said adjacent facing edge of said second conductor; whereby said first conductor and portions of said semiconductor layers in juxtaposition over said first conductor define a first solar cell, said second conductor and portions of said semiconductor layers in juxtaposition over said second conductor define a second solar cell, and said solar cells are electrically connected in series by virtue of said low resistance path.

4,042,419

PROCESS FOR THE REMOVAL OF SPECIFIC CRYSTAL STRUCTURE DEFECTS FROM SEMICONDUCTOR DISCS AND THE PRODUCT THEREOF

Wolfgang Heinke, Mehring-Oed; Helmut Kirschner, Burghausen, and Detlef Reimann, Engelsberg, all of Germany, assignors to Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH, Burghausen, Germany

Filed July 23, 1976, Ser. No. 708,235
Claims priority, application Germany, Aug. 22, 1975, 2537464
Int. Cl.[2] H01L *21/322, 21/324*
U.S. Cl. 148—1.5 **7 Claims**

1. A process for the removal of point defects and point defect agglomerates from semiconductor discs, comprising the steps of providing one side of the semiconductor discs with a mechanical stress field and then subjecting the discs to a heat treatment.

7. A semiconductor disc free of point defects and point defect agglomerates when made by the process defined in claim **1.**

4,042,420

METHOD OF PRODUCING MANGANESE OXIDE SOLID ELECTROLYTE CAPACITOR

Atsushi Nishino; Akihiko Yoshida, and Hayashi Hayakawa, all of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Nov. 18, 1975, Ser. No. 633,151

Claims priority, application Japan, Nov. 20, 1974, 49-134055; Nov. 20, 1974, 49-134056; Nov. 20, 1974, 49-134057

Int. Cl.[2] C23F *17/00*; H01G *9/16*

U.S. Cl. 148—6 14 Claims

1. A method of producing a solid electrolyte capacitor having a layer of manganese dioxide as the electrolyte, the method comprising the steps of:

a. preparing a substrate by forming a dielectric oxide coating on a surface of a valve metal member;

b. immersing said substrate in an aqueous solution consisting of water and manganese nitrate;

c. heating the wet substrate to cause pyrolytic decomposition of manganese nitrate to manganese dioxide;

d. immersing said substrate subsequently to said step (c) in an aqueous solution consisting of water and manganese nitrate; and

e. heating the wet substrate subsequently to said step (d) to cause pyrolytic decomposition of manganese nitrite to manganese dioxide, one of said steps (c) and (e) being carried out in a furnace of a hot air circulation type by flowing a heated air around said substrate, the other being carried out in a heating chamber of a radiant furnace, said chamber being semi-closed and in communication with the atmosphere exclusively through at least one vent formed in the wall of said chamber, heat for said pyrolytic decomposition in said radiant furnace being transferred from the wall of said chamber dominantly by radiation, said at least one vent having a predetermined area such that said pyrolytic decomposition proceeds under a positive pressure of a small magnitude due to a relatively prolonged retention of gaseous decomposition products in said chamber.

4,042,421

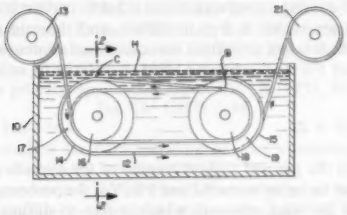
METHOD FOR PROVIDING STRONG TOUGH METAL ALLOYS

Jaak Stefaan Van Den Sype, Mount Kisco; William Alphonse Kilinskas, Cortlandt, both of N.Y.; Richard Benedict Mazzarella, Indianapolis, Ind., and John Bernard Lightstone, White Plains, N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Dec. 3, 1975, Ser. No. 637,452

Int. Cl.[2] C21O *9/52*

U.S. Cl. 148—12 E 14 Claims



1. A process for improving the strength-toughness characteristics of an austenitic metal alloy selected from the group consisting of stainless steel alloys of the AISI 200 and 300 series and non-stainless steel alloys containing iron, manganese chromium, and carbon, said alloy having an Md temperature of no higher than about 100° C and an Ms temperature of no higher than about minus 100° C comprising the following steps:

a. deforming the alloy at a strain of at least about 10 percent and at a temperature in the range of about Md minus 50° C to about Md plus 50° C, said Md temperature being that of the alloy undergoing deformation, in such a manner that the material has a martensite phase of no greater than about 10 percent by volume and an austenite phase of at least about 90 percent by volume; and

b. deforming the material produced in step (a) at a strain of at least about 10 percent and at a temperature no higher than about minus 75° C in such a manner that the material has a martensite phase of at least about 50 percent by volume and an austenite phase of at least about 10 percent by volume.

4,042,422

METHOD FOR FORMING BEARING UNIT

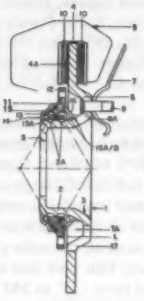
Sture L. Åsberg, Partille, Sweden, assignor to SKF Industries, Inc., King of Prussia, Pa.

Division of Ser. No. 411,855, Nov. 1, 1973, Pat. No. 3,884,331. This application Mar. 17, 1975, Ser. No. 559,094

Claims priority, application Netherlands, Nov. 9, 1972, 7215139; Nov. 28, 1972, 7216088

Int. Cl.[2] C21D *9/40*

U.S. Cl. 148—12 R 14 Claims



1. In a method for forming a rotary element for a wheel, the wheel having a bearing race, a brake portion including a brake disc or drum, and a flange, wherein each of the portions of the rotary element are heat treated; the improvement comprising forming said rotary element as a single homogeneous steel forging, including said bearing race, brake portion and flange, said step of heat treating comprises heat treating said steel forging as a unit, and further comprising surface treating said bearing race.

4,042,423

METHOD FOR PROVIDING STRONG WIRE AND STRIP

Jaak Stefaan Van den Sype, Mount Kisco; William Alphonse Kilinskas, Cortlandt, both of N.Y., and Richard Benedict Mazzarella, Indianapolis, Ind., assignors to Union Carbide Corporation, New York, N.Y.

Filed Dec. 3, 1975, Ser. No. 637,392

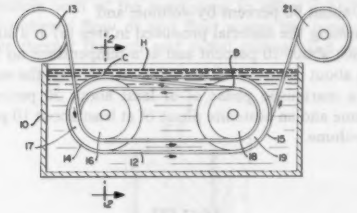
Int. Cl.[2] C21D *9/52*

U.S. Cl. 148—12 B 8 Claims

1. A process for improving the strength characteristics of wire or strip having a composition consisting essentially of an austenitic metal alloy selected from the group consisting of stainless steel alloys of the AISI 200 and 300 series and non-stainless steel alloys containing iron, manganese, chromium, and carbon, said alloy having an Md temperature of no higher than about 100° C and an Ms temperature of no higher than about minus 100° C comprising the following step:

a. stretching the wire or strip uniaxially at a strain of at least about 10 percent and at a temperature no higher than

about minus 75° C in such a manner that the wire or strip has a martensite phase of at least about 50 percent by volume and an austenite phase of at least about 10 percent by volume.



4,042,424

ELECTRICAL CONDUCTORS OF ALUMINUM-BASED ALLOYS

Jean-Claude Nicoud, Saint-Egreve, France, assignor to Societe de Vente de l'Aluminium, Paris, France

Filed May 28, 1976, Ser. No. 691,009

Claims priority, application France, May 28, 1975, 75.17201

Int. Cl.[2] C22F *1/04*

U.S. Cl. 148—12.7 A **5 Claims**

1. In a process for producing electrical cables from aluminum-based alloys consisting by weight from 0.15% to 0.35% of iron, from 0.30% to 0.70% of silicon, from 0.30% to 0.80% of magnesium, less than 0.40% of copper, and the remainder being aluminum and usual impurities, comprising the sequential steps of forming said alloy into a wire rod, subjecting said rod to solution heat treatment, quenching of said heat treated rod, drawing the rod into thin wire and artificially aging said wire at a temperature of from 130° to 240° C the improvement comprising said drawing comprising tepid drawing at a temperature of from about 110° C to about 180° C with an elongation of at least 350%, the ultimate tensile strength of the conductors being at least 37 kg/mm², having an elongation at the breaking point of at least 4% and an electrical resistivity of at most 3.28 micro-ohms/centimeter.

4,042,425

PROCESS OF PRETREATING COLD-ROLLED STEEL SHEET FOR ANNEALING

Nobuo Ohashi; Motoyuki Konishi; Minoru Nishida, and Yukio Inokuchi, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

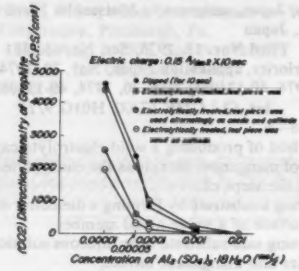
Division of Ser. No. 295,721, Oct. 6, 1972, abandoned. This application May 19, 1975, Ser. No. 578,937

Claims priority, application Japan, Oct. 11, 1971, 46-79432; Oct. 23, 1971, 46-83664; Oct. 23, 1971, 46-83665; Nov. 5, 1971, 46-87551

Int. Cl.[2] C21D *1/44;* C22B *35/00;* C25D *5/50*

U.S. Cl. 148—13.1 **15 Claims**

1. A method for the suppression of graphite carbon formation on the surface of a cold-rolled, low carbon steel sheet due to carbon separation from the interior of the steel and for the suppression of nitrogenization of said steel sheet during annealing for recrystallization of said steel sheet, comprising coating the surface of said steel sheet before annealing with a mixture containing at least one compound in a concentration of 0.00001 to 0.001 mol/**1,** said at least one compound containing one or more of the elements selected from the group consisting of sulfur, aluminum, antimony, lead, bismuth, arsenic, tin, selenium and tellurium, said mixture being coated on said steel sheet electrolytically by passing said steel sheet through an electrolytic bath containing said mixture, said bath having a charge density of 1 to 20 coulombs/dm².



4,042,426

CHROMIZED STEEL SUBSTRATE

Carl Adolph Beiser, Coraopolis, Pa., assignor to National Steel Corporation, Pittsburgh, Pa.

Division of Ser. No. 557,177, March 10, 1975, Pat. No. 3,969,550, which is a continuation-in-part of Ser. No. 387,627, Aug. 13, 1973, abandoned. This application June 21, 1976, Ser. No. 698,111

Int. Cl.[2] B32B *15/18*

U.S. Cl. 428—667 **26 Claims**

1. A chromized ferrous metal substrate prepared by a process wherein a ferrous metal substrate is heat treated at an elevated chromizing temperature in a protective chromizing atmosphere in the presence of a source of chromium and a chromizing energizer until a corrosion resistant chromized coating is produced thereon, such process including the improvement in combination therewith which comprises emloying as the said ferrous metal substrate a plain low carbon columbium treated steel substrate initially having a total carbon content of at least 0.03% and containing about 0.03–0.15% of columbium, the carbon content of the steel being partially stabilized by the columbium whereby a portion of the carbon content is free to diffuse upon heating the steel substrate to the said elevated chromizing temperature, the steel substrate being heat treatable at the said elevated chromizing temperature in the protective chromizing atmosphere in the presence of the source of chromium and the chromizing energizer to produce a carbon-containing chromized coating thereon having a metallographically measured thickness of about 1–3 mils, the said chromized coating containing about 0.2–1% carbon from the steel substrate which is free to diffuse, and the said carbon content which is free to diffuse, the columbium content and the thickness of the steel substrate being correlated to satisfy the equation

$$A = Y \times Z,$$

where A is the percent carbon content of the said chromized coating and varies between 0.2 and 1%, Y is the percent carbon content of the steel substrate which is free to diffuse and is determined by the following equation

$$\%\text{Diffusible Carbon} = \%\text{ Total Carbon} - \frac{\%\text{Columbium Content}}{8} + \frac{0.01\%}{1}$$

and Z is a multiplication factor determined by the equation

$$\text{Multiplication Factor} =$$

-continued

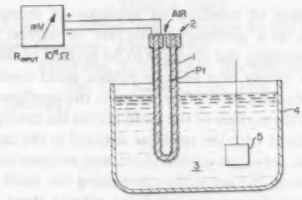
$$\frac{\text{The steel substrate thickness in mils}}{\text{The total chromized coating thickness of the steel substrate in mils}}$$

where the total chromized coating thickness of the steel substrate is equal to twice the metallographically measured diffusion layer of the said chromized coating plus one mil.

4,042,427
PROCESS FOR CONTROLLING FUSED SALT NITRIDATION OF METALS WITH A SOLID ELECTROLYTE ELECTRODE

Claus Razim; Csaba Lovasz, both of Stuttgart, and Kurt Baier, Fellbach, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Mar. 21, 1975, Ser. No. 560,822
Claims priority, application Germany, Mar. 21, 1974, 2413643
Int. Cl.² C21D *1/48*
U.S. Cl. 148—15.5 **15 Claims**



1. A process for controlling the nitriding effect of a nitriding bath of a salt melt containing alkali cyanate, for the nitridation of iron and iron alloys, which comprises providing a nitriding bath comprising a salt melt, said salt melt consisting essentially of 60–100% by weight of alkali cyanate, calculated as KOCN, 0–40% by weight of alkali metal chloride, alkaline earth chloride or mixture of said chlorides, calculated as NaCl, and a balance comprised of by-products of the cyanate or chlorides and the decomposition products thereof, determining the voltage established on an electrode of an oxygen ion-conducting solid electrolyte immersed in said salt melt, said electrolyte being capable of yielding well measurable voltages in said salt melt, and adjusting the voltage established by said solid electrolyte to be within a range of between **0.7** and **1.1** volt at a temperature of the salt melt that is between 500° and 650° C.

4,042,428
PROCESS FOR HARDENING IRON-CONTAINING SURFACES WITH ORGANIC SOLVENT AND AMMONIA

Takeji Asai, and Kaishu Yamazumi, both of Toyama, Japan, assignors to Kabushiki Kaisha Fujikoshi, Toyama, Japan

Filed Sept. 8, 1975, Ser. No. 611,079
Claims priority, application Japan, Feb. 28, 1975, 50-25265
Int. Cl.² C21D *1/48*
U.S. Cl. 148—16.5 **3 Claims**

1. A method for carbonitriding an iron containing metal structure comprising the steps of:

heating a furnace to the transformation point of steel, said transformation point being below about 650° C;

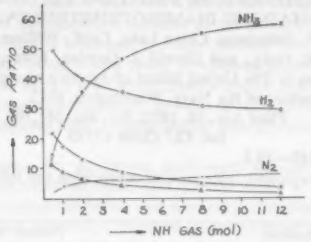
placing said metal structure in said furnace;

supplying said furnace with a carbonitriding atmosphere comprising a mixture of ammonia gas and a vaporized and decomposed oxygen containing liquid organic solvent wherein the ratio of carbon atoms to oxygen atoms in the liquid organic solvent is from 0.5 to 1.5 and wherein the ratio of moles of liquid organic solvent to moles of ammonia gas is from 1:1 to 1:12;

maintaining said article in said carbonitriding atmosphere until at least the surface of said iron-containing article has increased its carbon and nitrogen content a predetermined amount;

removing said carbonitriding atmosphere from said furnace;

mixing said removed carbonitriding atmosphere with a fuel gas;



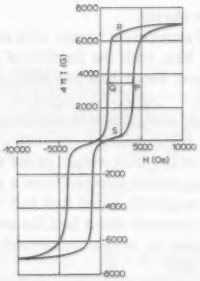
burning said mixture of fuel gas and said removed carbonitriding atmosphere; and

removing said structure from said furnace.

4,042,429
MAGNETIC ALLOYS HAVING WASP-WAISTED MAGNETIC HYSTERESIS LOOP

Shigeru Kojima, Kyoto; Kiyoshi Kojima, Hirakata; Tadao Ohtani; Nobuyuki Kato, both of Katano; Yoichi Sakamoto, Hirakata; Isago Konno; Masaharu Tsukahara, both of Neyagawa, and Takao Kubo, Kawachinagano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 1, 1974, Ser. No. 511,476
Claims priority, application Japan, Oct. 3, 1973, 48-111804
Int. Cl.² C04B *35/00*; H01F *1/04*; C22C *28/00*
U.S. Cl. 148—31.55 **3 Claims**



1. A worked and heat-treated alloy product having a wasp-waisted magnetic hysteresis loop prepared by tempering an alloy composition consisting essentially of 68.0 to 73.0% by weight of manganese, (1/10 Mn - 6.6)% to (⅛ Mn - 22.2)% by weight of carbon and the remainder aluminum, said alloy having a hexagonal crystalline structure, at a temperature of from 530° to 750° C under an anisotropic stress of from 15 to 50 kg/mm² until the hexagonal crystalline structure of the alloy is transformed into a tetragonal crystalline structure; said alloy product thus-prepared, exhibiting a magnetic hysteresis loop in a wasp-waisted form such that the $4\pi I_{10000}$ value is at least 5800 G wherein $4\pi I_{10000}$ represents the intensity of magnetization in a magnetizing force of 10000 Oe and such that the value of the ratio $Id/2Ir$ is more than 2 wherein Id represents the value of $[4\pi I(R) - 4\pi I(S)]/4\pi$; $4\pi I(R)$ and $4\pi I(S)$ represent the intensity of magnetization at the intersecting points R and S of the wasp-waisted hysteresis loop and the perpendicular bisector of the line PQ, respectively as shown in the graph of the drawing; P and Q each represent points which give a half value of

$4\pi I_{10000}$ and I_r represents the residual magnetization divided by 4π.

4,042,430

TEMPERATURE RESISTANT EXPLOSIVE CONTAINING DIAMINOTRINITROBENZENE

Charles W. Falterman, China Lake, Calif.; William J. Griffith, Chemult, Oreg., and Harold J. Gryting, Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 10, 1972, Ser. No. 242,795
Int. Cl.[2] C06B *45/10*
U.S. Cl. 149—19.3 1 Claim

1. An explosive composition comprising the following

Ingredients	Percent by Weight
Aluminum	24
Potassium perchlorate	46
Diaminotrinitrobenzene	25
Copolymer of vinylidene flouride and perflouropropene	5

4,042,431

TWO COMPONENT FIELD MIX HYDRAZINE BASE EXPLOSIVE

James E. Friant, and Marshall E. Klopich, both of Renton, Wash., assignors to Rocket Research Corporation, Redmond, Wash.

Filed July 17, 1975, Ser. No. 596,763
Int. Cl.[2] C06B *47/08*
U.S. Cl. 149—36 38 Claims

1. A two component field mix explosive composition, comprising:

a. a first solid component selected from a group consisting of:

1. ammonium nitrate,
2. mixtures of ammonium nitrate with ammonium perchlorate or the like, with the amount of ammonium nitrate being at least about half the total weight of the first component,

b. a second liquid component comprising:

1. hydrazine in an amount between about two-fifths to two-thirds of the total weight of the second component,
2. a second ingredient selected from a group consisting of water, a compatible liquid fuel and mixtures thereof in an amount between about half the amount of hydrazine to an amount by weight moderately greater than the hydrazine, and
3. ammonium nitrate in an amount no greater than about one-sixth of the total weight of the second component,

with the proportion of said second component to the first component being between about one to two parts by weight to about fifteen parts by weight of the solid component and present in an amount adequate to form an explosive composition.

4,042,432

DESENSITIZER FOR N-PROPYL NITRATE

B. Arthur Breslow, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 13, 1976, Ser. No. 749,935
Int. Cl.[2] C06B *25/36*
U.S. Cl. 149—89 7 Claims

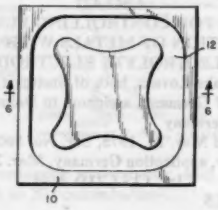
1. A composition of matter comprising a solution of low gamma gas in n-propyl nitrate,, said low gammma gas having a gamma value of 1.15 or less.

4,042,433

APPLIQUEING SYNTHETIC RESINS ON SHEET MATERIAL

Henry Hardy, Cambridge, and Adrian E. Balfour, Framingham, both of Mass., assignors to Compo Industries, Inc., Waltham, Mass.

Filed July 7, 1975, Ser. No. 593,715
Int. Cl.[2] B32B *31/00*; B29C *19/04*; B29H *5/26*
U.S. Cl. 156—87 2 Claims



1. The method of bonding an applique of thermoplastic synthetic resin to a permeable substrate of woven material comprising depositing the applique to be applied to the woven material in the cavity of a silicone rubber mold containing a cavity corresponding in configuration to the applique, superimposing upon the surface of the mold across the cavity therein and in engagement with the applique situated in the cavity, the woven material, a porous release sheet, and an open cell absorbent sheet, placing the assembly comprising the mold containing the applique, the woven sheet, the release sheet, and the absorbent sheet between the platens of a high frequency press and while maintaining the platens at a temperature below the fusion temperature of the synthetic resin of the applique, applying pressure to the assembly and simultaneously subjecting the assembly to high frequency heating at a pressure level such as to fuse the synthetic resin, drive such vapors as are generated in the woven material through the release sheet and induce penetration of the fused synthetic resin into the woven material and while subjecting the assembly to heating between the platens, trapping the generated vapors penetrating the release sheet within the absorbent sheet.

4,042,434

BONDED GEAR ASSEMBLY

Theodore Ivanko, Fairfield, Conn., assignor to Avco Corporation, Stratford, Conn.

Filed Apr. 12, 1976, Ser. No. 675,752
Int. Cl.[2] B32B *7/04*
U.S. Cl. 156—91 3 Claims

1. A method of interconnecting driving and driven gear members by combination mechanical fastener and resinous bonding means, comprising the steps of:

forming complementary mating faces on adjoining web portions of the driving and driven gears;

removing an annulus of material from selected portions of

said complementary faces to form a cavity between said faces;

forming an access orifice in the web portion of one of said gears, said orifice providing communication with the between-web cavity formed when mating faces of said driving and driven geared are joined;

fastening together by mechanical means the driving and driven gears, said fastening means serving to coaxially secure the driven gear to the driving gear, said fastening means providing a transfer of torque from the web of said driving gear to the web of said driven gear;

injecting thermal setting resin through said access office and filling said cavity between said faces of said gears;

curing said resin to its hardened state; and

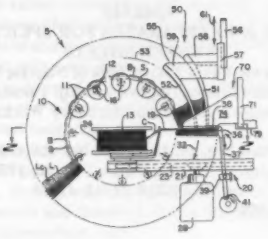
readjusting said mechanical fasteners to prescribed torque values whereby load carrying capabilities between gear members are optimized.

4,042,435

CLOSED TORUS WOUND CARCASS FOR A CLOSED TORUS TIRE

Stanley J. Houck, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jan. 5, 1976, Ser. No. 646,718
Int. Cl.² B29H *15/00, 17/02*
U.S. Cl. 156—121 **22 Claims**



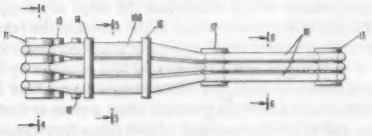
1. A method of building a cord wound torus carcass for a closed torus tire, the method comprising mounting a bead ring-spacer ring assembly and a carcass liner for rotation about a common axis, wrapping a cord spirally around a plurality of cord control fingers disposed closely about said liner to form a plurality of turns of cord, and transferring successive turns of cord from the control fingers to the liner, the cord in successive turns so transferred being substantially free of tension.

4,042,436

METHODS AND APPARATUS FOR PRODUCING SHEATHS FOR BATTERY ELECTRODES

Erik Sundberg, Yardley, Pa., and Erik Westberg, Lidingo, Sweden, assignors to Aktiebolaget Tudor, Sundbyberg, Sweden

Filed Dec. 20, 1976, Ser. No. 752,257
Claims priority, application Sweden, Dec. 23, 1975, 7514580
Int. Cl.² B32B *1/08*; H01M *2/02*
U.S. Cl. 156—182 **12 Claims**



1. A method for producing interconnected, multi-layer sheaths for electrodes of electrical batteries comprising:

introducing an inner layer of fibrous material around a plurality of adjacent mandrels;

introducing an outer layer of material around the inner layer;

passing the inner and outer layers along connector sections of said mandrels having elongate cross-sectional configurations;

connecting said inner and outer layes together and bonding sheaths on adjacent mandrels while on the elongate cross-sectional configuration sections of the mandrels to form interconnected tubes and thereafter passing the connected inner and outer layers along re-shaping sections of the mandrels having a different cross-sectional configuration than that of said connector sections to reshape the sheaths to the desired final cross-sectional configuration of said sheaths.

10. Apparatus for producing multi-layer sheaths for electrodes of electrical batteries, said sheaths being of the type having interconnected tubes, said apparatus comprising:

a plurality of adjacently disposed mandrels over which are introduced inner and outer layers of sheath material to be connected together, said mandrels each including a connector section along which the layers are bonded to form tubes and along which adjacent tubes are bonded and a downstream re-shaping section;

said connector sections having a cross-sectional configuration which is elongate;

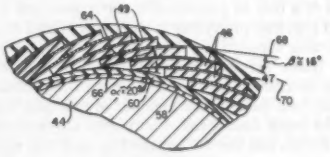
said re-shaping sections having a cross-sectional configuration which is different from that of said connector sections to reshape the sheaths to the desired final cross-sectional configuration of said tubes.

4,042,437

METHOD OF MANUFACTURING NIP ROLL FOR TREATING WEB MATERIALS

Ernest J. Groome, Covington, Va., assignor to Clupak, Inc., New York, N.Y.

Division of Ser. No. 582,105, May 30, 1975, Pat. No. 3,995,354.
This application Apr. 14, 1976, Ser. No. 676,910
Int. Cl.² B32B *31/04*
U.S. Cl. 156—212 **4 Claims**



1. A method of producing a nip roll which comprises:

a. taking a substantially cylindrical member constructed of a substantially rigid material;

b. securing successive strips of substantially incompressible and resilient elastomer material along the length of said roll with the lengths of the strips being parallel to the axis of the roll and in a manner such that the strip has an arcuate configuration and extends generally at an acute angle to a plane tangent to said rigid cylindrical roll passing through the line of contact between the strip of elastomer material and the cylindrical roll, the arcuate configuration being such that the angle formed between the strip of elastomer material and said tangent plane being greater than the corresponding angle that the free end of the strip of elastomeric material makes with the intersecting plane tangent to the outer surface of the roll;

c. laminating a section of reinforcing fabric on said elastomer section so as to cause the fabric to assume the arcuate configuration of the elastomer section;

d. repeating the steps of alternating laminating elastomer sections configured substantially identically to said first elastomer section sufficiently to produce a fabric cover

surrounding substantially the entire peripheral surface portions of said cylindrical roll;

e. placing the entire reinforcing elastomer covered roll in an air impervious enclosure;

f. drawing vacuum in said air impervious enclosure; and

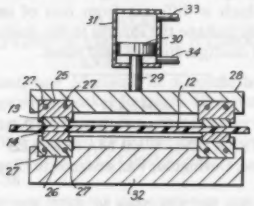
g. subjecting said covered roll to an elastomer curing process while simultaneously maintaining a vacuum within said impervious closure to at least partially soften the elastomer material and thereafter causing it to become cured to thereby form a substantially uniform continuous cylindrical cover member having a cross-section of alternating arcuate elastomer sections alternating with arcuate reinforcing fabric sections positioned therebetween.

4,042,438

METHOD OF ASSEMBLING A DIAPHRAGM ASSEMBLY FOR AN ELECTRO-ACOUSTIC TRANSDUCER

Hirotake Kawakami; Kantaro Takada, and Toru Fukumoto, all of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed July 14, 1975, Ser. No. 595,438
Claims priority, application Japan, July 16, 1974, 49-81499
Int. Cl.[2] C09J *7/02;* **H04R** *7/06*
U.S. Cl. 156—272 **2 Claims**



1. The method of assembling at least one metal frame member in abutting supporting relation to a diaphragm member to form an electret assembly for an electro-acoustic transducer, comprising the steps of forming said diaphragm member as a lamination of a film of polytetrafluoroethylene and a layer of fluorinated ethylene-propylene at each side of said film which, in said abutting supporting relation, faces toward a surface of each said frame member, pressing together said frame and diaphragm members in said abutting supporting relation while heating each said metal frame member so that heat transmitted through the latter causes said fluorinated ethylene-propylene to melt at the portion thereof engaged by each said metal frame member, halting the heating of each said frame member so that said fluorinated ethylene-propylene hardens to bond said frame and diaphragm members to each other in said abutting supporting relation, and electrically charging said diaphragm member so that the latter and each said frame member bonded thereto provides an electret assembly.

4,042,439

METHOD OF MAKING KEYBOARD ASSEMBLIES

Walter R. Pounds, Lafayette, Colo., assignor to KB-Denver, Inc., Loveland, Colo.

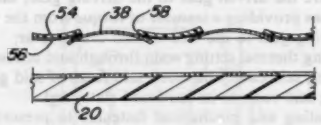
Division of Ser. No. 576,694, May 12, 1975, Pat. No. 3,967,084.
This application Feb. 27, 1976, Ser. No. 662,037
Int. Cl.[2] B29H *7/04;* **B32B** *31/00*
U.S. Cl. 156—292 **8 Claims**

1. In the assembly of a plurality of dome-shaped resilient contact elements in a predetermined pattern to overlie a similar pattern of spaced-conductor regions carried upon an insulating substrate, so that said elements may be centrally depressed to bridge spaced conductor portions, the steps of:

stocking a plurality of said elements in each of a plurality of wells disposed in a plate in a pattern corresponding to said predetermined pattern;

positioning a layer of flexible insulating material, adhesively coated on its undersurface, over the stacks of said elements in said plate with said layer including a plurality of apertures arranged in said predetermined pattern and individually of a diameter smaller than the width of said elements;

pressing said layer against the uppermost one of said elements in each of said stacks with said apertures in registry with said uppermost ones of said elements;



downwardly depressing all of said uppermost ones of said elements;

removing said layer, with said uppermost ones of said elements thereto adhesively affixed, to a position overlying said substrate with said uppermost ones of said elements in registry with said corresponding pattern of regions;

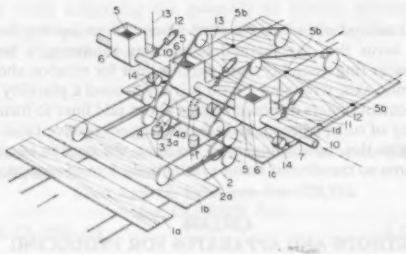
and pressing said layer against said substrate, while maintaining said registry, to adhesively secure said layer in a position mounted upon said substrate.

4,042,440

METHOD AND APPARATUS FOR SPLICING OF VENEER SHEETS

Katsuji Hasegawa; Yukio Takagi, both of Nagoya; Sachio Naito, Ohbu; Kenichi Hiraiwa, Nagoya, and Eiji Takasu, Nagoya, all of Japan, assignors to Meinan Machinery Works, Inc., Ohbu, Japan

Filed Feb. 19, 1976, Ser. No. 659,476
Claims priority, application Japan, Feb. 20, 1975, 50-21665
Int. Cl.[2] B32B *31/12, 31/18*
U.S. Cl. 156—304 **15 Claims**



1. In a method of splicing veneer sheets which comprises, feeding spaced-apart veneer sheets in a predetermined direction, bringing the veneer sheets into substantially tight end-to-end abutment against each other, cold pressing at least one strand against said veneer sheets and simultaneously applying a thermoplastic adhesive onto the surface of a preceding veneer sheet by means of a cooling means supported at a first position, the improvement which comprises the steps of: stopping the feed of a preceding veneer sheet at the moment the rear-end of said preceding veneer sheet arrives at a second position on the infeed side which is spaced from said first position by a predetermined distance; feeding a succeeding veneer sheet until the front-end of said succeeding veneer sheet arrives at said second position and abuts the rear-end of said preceding veneer sheet; applying a thermoplastic adhesive bead in a molten state onto said strand at a localized portion thereof which is maintained out of engagement with the sheets and is on the infeed side of the cooling means, the length of the strand between said first position and the localized portion of the strand being equal to

the distance between said first and second positions; and feeding said preceding veneer sheet and said succeeding veneer sheet in a horizontal direction to cause said length of the strand to be cold pressed against said preceding sheet and to cause said thermoplastic adhesive bead to pass through said first position so that said thermoplastic adhesive bead is cold pressed and applied onto the abutting end portions of said preceding and succeeding veneer sheets in the form of an adhesive film containing part of said strand therein and covering a substantial area which spans the preceding and succeeding veneer sheets.

4,042,441

MECHANICAL-CHEMICAL LINKAGE BETWEEN POLYMER LAYERS

Bernard Wasserman, Ridgecrest, and Martin H. Kaufman, China Lake, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 6, 1976, Ser. No. 683,996
Int. Cl.[2] C09J *5/00*
U.S. Cl. 156—306 **6 Claims**

1. A method of bonding a polymeric hydrocarbon to an incompatible rubber comprising the steps of:

forming a long chain polymer containing at least one group insoluble in and non-reactive with said rubber but reactive with said polymeric hydrocarbon;

forming a mixture of said long chain polymer and said rubber while the rubber is uncured;

allowing said long chain polymer to migrate to a surface of said rubber; curing said rubber; and

placing said polymeric hydrocarbon on said surface of the mixture, thereby reacting the reactive with the polymeric hydrocarbon and thereby bonding the rubber to the polymeric hydrocarbon; and

curing said polymeric hydrocarbon on said incompatible rubber.

4,042,442

2-CYANOACRYLATE ADHESIVE COMPOSITION

John R. Dombroski, Kingsport, and Doyle A. Weemes, Greeneville, both of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 29, 1976, Ser. No. 745,757
Int. Cl.[2] B32B *7/00*
U.S. Cl. 156—310 **18 Claims**

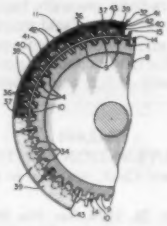
13. A method of bonding the surfaces of articles together by the use of a monomeric ester of 2-cyanoacrylic acid adhesive composition, comprising moistening at least one of the surfaces to be bonded with a solution consisting of from 0.1 to 10 parts by weight of a compound selected from caffeine and theobromine and from 90 to about 99.9 parts by weight of a solvent having a boiling point of 100° C. or below selected from the group consisting of water, saturated monohydroxy aliphatic alcohols containing from 1 to 4 carbon atoms, an ester of said alcohol with a saturated monobasic fatty acid containing from 1 to 3 carbon atoms, acetone, methyl ethyl ketone, methylene chloride, chloroform, diethyl ether, dimethyl ether, methyl chloroform, and mixtures thereof, and thereafter applying to the surface of at least one of the surfaces to be bonded a film of an adhesive composition comprising a monomeric ester of 2-cyanoacrylic acid and maintaining said surfaces in contact.

4,042,443

FLEXIBLE MATRIX FOR FORMING A PORTION OF A TOOTHED POWER TRANSMISSION BELT

Ronald D. Hoback, and Joseph C. Geist, both of Lincoln, Nebr., assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 337,056, March 1, 1973, Pat. No. 3,897,291.
This application Mar. 24, 1975, Ser. No. 560,763
Int. Cl.[2] B32B *31/06;* **B29H** *1/22*
U.S. Cl. 156—349 **16 Claims**



1. A flexible grooved matrix used in combination with a rigid grooved mandrel for forming and retaining the tooth configuration of belt driving teeth of a previously formed toothed belt portion of a toothed power transmission belt, said matrix comprising:

A. a generally cylindrical body of flexible polymeric material;

B. reinforcing means including at least one circumferentially disposed reinforcing member embedded in said body;

C. an inwardly facing surface having a plurality of tooth-forming and retaining grooves disposed therein, said grooves extending generally axially of said matrix and having a plurality of lands alternating therewith with said grooves being of an opposite configuration to that of the teeth of the toothed belt portion so as to register therewith; and

D. means at each axial end for registering and aligning said matrix grooves with the teeth of said previously formed toothed belt portion, said means comprising a plurality of teeth disposed in outer rows at each axial outer end of the matrix extending circumferentially thereof with each tooth extending axially thereof on said inwardly facing surface, said teeth being of an opposite configuration to that of the grooves of the mandrel so as to register therewith and protruding radially inwardly beyond the surface of said lands and said grooves and said lands extending axially between said outer rows.

7. In the manufacture of a toothed power transmission belt having transversely extending teeth on opposite surfaces thereof, the combination of:

A. a rigid cylindrical mandrel having a plurality of grooves in its outer peripheral surface extending axially thereof;

B. a first preformed belt portion of flexible polymeric material having a plurality of driving teeth on one surface thereof, said first belt portion surrounding said mandrel to form an endless belt sleeve with the teeth of said first portion lying within the grooves of the mandrel, said belt sleeve having a width less than the axial length of the mandrel so that a portion of the outer peripheral surface of the mandrel at each end is exposed;

C. a second preformed belt portion of flexible polymeric material having a plurality of driving teeth in one surface thereof, said second belt portion surrounding said first belt portion to form an endless belt sleeve with the teeth of said second portion facing outwardly of the mandrel, said belt sleeve having a width less than the axial length of the mandrel so that a portion of the outer peripheral surface at each end of the mandrel is exposed;

D. a flexible grooved generally cylindrical matrix surrounding said second portion, said matrix having a plurality of

teeth provided in one surface thereof, said teeth disposed in outer rows at each axial end of the matrix with the teeth of each row extending axially of the matrix and facing inwardly of the mandrel, and a plurality of lands and grooves on the inwardly facing surface thereof extending axially between said rows of teeth, the teeth of said matrix having an opposite configuration to that of the grooves of the mandrel and the grooves of the matrix having an opposite configuration to that of the teeth of said second belt portion, said matrix having a greater axial length than the first and second belt portions and the teeth of said matrix protrude radially inwardly beyond the surface of said lands so that the teeth of said matrix face inwardly of the mandrel and mesh with the grooves of the mandrel in the exposed surface thereof and the grooves of said matrix mesh with the teeth of said second belt portion.

4,042,444

ETCHANT REJUVENATION CONTROL SYSTEM

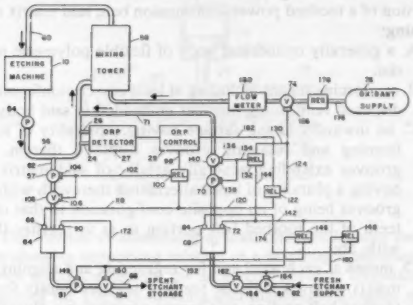
H. Ben Snyder, Upland, Calif., assignor to General Dynamics, Pomona, Calif.

Filed Apr. 26, 1976, Ser. No. 680,027

The portion of the term of this patent subsequent to June 22, 1993, has been disclaimed.

Int. Cl.² C23F *1/02*

U.S. Cl. 156—345 **14 Claims**



1. An etchant rejuvenation control system for use in an etching machine having a quantity of working etchant for etching metal from a workpiece comprising:

means for detecting a variation of the ORP of a working etchant,

means for withdrawing a predetermined volume of etchant upon a predetermined change in said detected ORP,

means for sensing completion of the withdrawing of etchant,

means responsive to said withdrawing of etchant for initiating the injection into the working etchant of an oxidizer at a predetermined flow rate,

means for terminating the injection of said oxidizer when said detected ORP returns to the initial level,

means responsive to the withdrawal of etchant for adding fresh etchant,

means for terminating the addition of fresh etchant after a predetermined volume has been added.

4,042,445

STAMP AND LEGEND APPLICATING MACHINE

Robert N. Klund, Stillwater, and James S. Weidenbach, Anoka, both of Minn., assignors to Delkor Industries, Inc., Minneapolis, Minn.

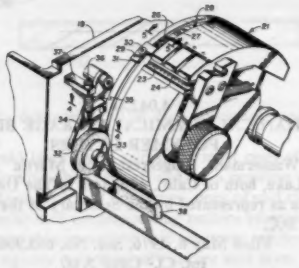
Filed May 17, 1976, Ser. No. 686,742

Int. Cl.² B43M *13/00*

U.S. Cl. 156—385 **9 Claims**

1. In a postage stamp applying machine including a frame, a stamp roll holder mounted on said frame, a driven stamp metering mechanism carried by said frame for withdrawing stamps from said stamp roll holder and metering the same, means connected to said mechanism for driving the same, and means carried by said frame for moistening and severing such stamps after they have been metered by said mechanism, the improvement comprising:

a. a postage stamp applying wheel rotatably mounted on said frame and constructed and arranged to receive postage stamps from said metering mechanism and having an axially extending slot formed in its circumferential surface through which stamps are metered by said metering mechanism, said wheel having a circumferentially extending groove adjacent said slot formed in its circumferential surface,



b. a printer member mounted within said groove and extending slightly radially outwardly therebeyond,

c. inking means mounted adjacent the groove of said wheel in position to engage and apply ink to said printer member as said wheel rotates said member thereby, and

d. means carried by said frame and synchronized with said stamp metering mechanism for rotating said wheel to cause stamps to be applied to envelopes as they pass below said wheel.

4,042,446

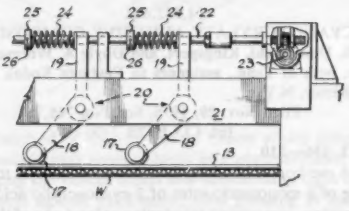
CORRUGATED BOARD-MAKING MACHINERY

Bernard Gaskell Lawton, Stockport, England, assignor to Henry Simon Limited, Stockport, England

Filed Aug. 14, 1975, Ser. No. 604,549

Int. Cl.² B32B *31/00*

U.S. Cl. 156—359 **5 Claims**



1. Apparatus for supplying heat and pressure to a corrugated paper board comprising heated means for supporting a web of the board as it is drawn thereover, an endless belt whose lower flight is adpated to overlie the web while it is drawn over said heated means and a plurality of freely rotatable transversely extending parallel longitudinally spaced rolls engaging the upper surface of the lower flight of said belt, a plurality of intermediately pivoted levers each having one of said rolls mounted on a downwardly extending arm, a reciprocable rod passing freely through apertures in upwardly extending arms on said levers, there being for each said lever a resilient compression spring surrounding said rod and disposed between the lever and abutment means secured to the rod, each said spring biasing its associated lever in a direction tending to reduce the

roll weight pressure exerted on said board, an actuator for controllably varying the position of said rod axially, whereby the force applied by each said spring to its associated lever may be controllably varied to vary the roll weight pressure exerted on said board, said actuator comprising a reversible motor driven mechanism connected to said rod and means automatically responsive to a condition of said board for controlling operation of said actuator.

4,042,447

CRYSTALLIZING A LAYER OF SILICON ON A SODIUM THALLIUM TYPE CRYSTALLINE ALLOY SUBSTRATE

Norman E. Reitz, Redwood City, Calif., assignor to Sotec Corporation, Redwood City, Calif.

Filed Nov. 1, 1976, Ser. No. 737,389
Int. Cl.[2] B01J *17/30, 17/32;* **C01B** *33/02*
U.S. Cl. 156—610 **16 Claims**

1. A method for producing solar cell quality crystalline silicon comprising:

providing a sodium thallium type crystalline alloy substrate selected from the group consisting of LiZn, LiAl, LiGa, LiCd, LiIn and NaTl

gradually applying silicon atoms thereto from the vapor state at a rate which allows said silicon atoms to arrange themselves for oriented crystal overgrowth on said substrate; and

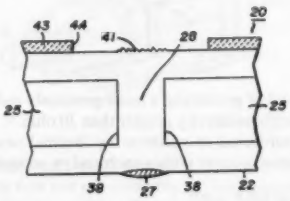
recovering a product comprising solar cell quality crystalline silicon upon a sodium thallium type crystalline substrate.

4,042,448

POST TGZM SURFACE ETCH

Mike F. Chang, Liverpool, N.Y., assignor to General Electric Company, Syracuse, N.Y.

Filed Nov. 26, 1975, Ser. No. 635,327
Int. Cl.[2] H01L *21/306*
U.S. Cl. 156—650 **18 Claims**



1. In the process of manufacturing a semiconductor device, the steps of:

thermally migrating a quantity of an impurity through a body of semiconductor material from a first surface to a second surface at an elevated temperature so as to provide in said body a region containing said impurity in a uniform distribution in an amount equal to the solid solubility limit of said impurity in said semiconductor material at said elevated temperature;

masking a part of said first surface, leaving exposed the portion of said first surface where said impurity entered; and

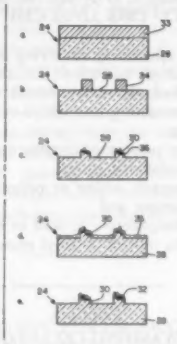
exposing said first surface to an etchant to remove about 1 mil of material from the non-masked portions thereof to substantially smooth said first surface at said non-masked portions.

4,042,449

METHOD OF MAKING A RETICLE-LENS

Robert E. Hunt, China Lake, and Kenneth L. Moore, Ridgecrest, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 598,896, July 24, 1975, Pat. No. 3,999,301.
This application Sept. 20, 1976, Ser. No. 724,448
Int. Cl.[2] C03C *15/00, 17/00*
U.S. Cl. 156—651 **3 Claims**



1. In a method for producing a reticle having a sapphire substrate underlying a titanium reticle pattern, the improvement which comprises:

depositing a layer of aluminum onto said sapphire substrate;

forming said aluminum to define a reticle pattern;

oxidizing said aluminum reticle pattern;

placing a film of titanium upon said sapphire substrate and said aluminum oxide to form an opague reticle pattern; and

removing said titanium film from other portions of said sapphire substrate than the oxidized reticle pattern portion.

4,042,450

METHOD FOR THE PRODUCTION OF FILMS HAVING THE DESIRED CONFIGURATION

Igor Danilovich Voitovich, Zadorozhny pereulok, 4, kv. 61; Maxim Timofeevich Kostyshin, ulitsa Melnikova, 46, kv. 40; Ekaterina Vasilievna Mikhailovskaya, ulitsa Nikolsko-Botanicheskaya, 27-29, kv. 10; Vyacheslav Vasilievich Petrov, ulitsa Kapitanovskaya, 28, kv. 15; Petr Fedorovich Romanenko, prospekt Nauki, 120, kv. 51, and Vladimir Petrovich Skuridin, prospekt 40 let Oktyabrya, 82, kv. 53, all of Kiev, U.S.S.R.

Continuation of Ser. No. 136,877, April 23, 1971, abandoned.
This application Dec. 7, 1973, Ser. No. 422,925
Int. Cl.[2] C23F *1/02*
U.S. Cl. 156—652 **6 Claims**

1. A method for the production of films of desired configuration comprising the steps: of coating a film, or substrate, with a system sensitive to electromagnetic radiation and consisting of a layer of metal and a layer of an inorganic substance capable of entering into a reaction with said layer of metal under the effect of electromagnetic radiation to form reaction products; irradiating the system in accordance with the required configuration; removing by etching the layer of inorganic substance that has not entered into reaction with said layer of metal; removing by etching the layer of metal in areas that

have not been irradiated; and etching said film or substrate in areas that have not been irradiated.

4,042,451

SELECTED STRIPPING OF NICKEL-IRON ALLOYS FROM FERROUS SUBSTRATES

Ronald J. Lash, Warren, and Edward P. Harbulak, Allen Park, both of Mich., assignors to M&T Chemicals Inc., Greenwich, Conn.

Filed Aug. 5, 1975, Ser. No. 602,140
Int. Cl.[2] C09K *13/00*; C23F *1/00*
U.S. Cl. 156—664 **19 Claims**

1. A process for selectively removing nickel-iron alloys or nickel-iron-cobalt alloys, said alloys containing from 5 percent to 90 percent iron, from the surface of a ferrous metal substrate which comprises contacting iron alloys with an aqueous alkaline bath containing:

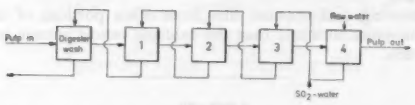
a. at least one nitro substituted organic compound containing at least one solubilizing group;
b. at least one organic amine or polyamine or substituted amine or polyamine; and
c. at least one phosphorus oxo acid or organic phosphorus oxo acid or salts thereof or alkyl phosphonate substituted amines.

4,042,452

PROCESS FOR WASHING CELLULOSE PULP FROM ALKALI DIGESTION WHEREIN ACID IS ADDED TO THE WASHING SOLUTION

Bengt Arhippainen, and Johan Gullichsen, both of Helsinki, Finland, assignors to A. Ahlstrom Osakeyhtio, Finland

Filed Aug. 27, 1975, Ser. No. 608,034
Claims priority, application Finland, Sept. 3, 1974, 742578
Int. Cl.[2] D21C *9/02*
U.S. Cl. 162—60 **4 Claims**



1. A process for washing a cellulose pulp from alkali digestion, prior to the bleaching stage wherein the pulp is fed into a multistage washing system comprising at least three countercurrently coupled washers/in sequence, acid is added directly to a washing solution thus lowering the pH of said solution to a value of 3 or lower at a stage immediately preceding the last washing stage when the concentration of dissolved organic substances is at a value that detrimental precipitation of the organic substances is prevented, the acidified fiber suspension is fed further to the last stage wherein the acidified solution is displaced from the fiber suspension by washing water, and the solution obtained form the last stage is used at least partially as a washing solution at the said stage immediately preceding the last stage.

4,042,453

TUFTED NONWOVEN FIBROUS WEB

Bernard W. Conway, Holyoke, Mass., and James Moran, Simsbury, Conn., assignors to The Dexter Corporation, Windsor Locks, Conn.

Continuation-in-part of Ser. No. 489,411, July 17, 1974, Pat. No. 3,960,652, which is a continuation-in-part of Ser. No. 341,699, March 15, 1973, Pat. No. 3,834,983. This application Apr. 2, 1976, Ser. No. 673,192
The portion of the term of this patent subsequent to Sept. 10, 1991, has been disclaimed.
Int. Cl.[2] D21F *11/00*
U.S. Cl. 162—108 **7 Claims**

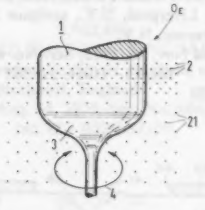
1. A tufted nonwoven water-laid fibrous web material exhibiting high loft, bulk, softness and absorbency comprised of a planar main body member of randomly arranged water dispersable fibers and a plurality of spaced unlooped fiber tufts integral with the main body member and extending freely from the surface thereof, the fibers within said planar body member exhibiting an orientation that is undisturbed from its as formed water-laid random configuration, said tufts being comprised of a puff-like head portion of consolidated fibers and a stem portion of substantially aligned fibers anchoring the head portion to the main body member, the fibers forming said stem portion having first ends extending into the main body member of the web material and opposite ends free of the main body and extending toward said head portion, the puff-like head portion being comprised of fibers spirally consolidated into a compressively resilient intorted and entangled bundle similar in appearance to a French knot.

4,042,454

METHOD OF PRODUCING HOMOGENEOUSLY DOPED n-TYPE Si MONOCRYSTALS BY THERMAL NEUTRON RADIATION

Ernst Haas; Joachim Martin, both of Erlangen; Konrad Reuschel, Vaterstetten, and Manfred Schnoeller, Haimhausen, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Nov. 6, 1974, Ser. No. 521,388
Claims priority, application Germany, Nov. 12, 1973, 2356376
Int. Cl.[2] G21G *1/06*
U.S. Cl. 176—10 **1 Claim**



1. A method of producing a homogeneously n-doped Si rod having a specific resistivity greater than 30 ohm × cm wherein a Si rod is subjected to radiation by thermal neutrons and a nuclear reaction occurs within such rod in accordance with:

$$Si^{30}(n, \gamma)\, Si^{31}\, \beta \rightarrow P^{31}$$

comprising:

subjecting a polycrystalline Si rod having a specific resistivity of 550 ohm × cm, n-type to at least one crucible-free zone melting process in a suitably protective environment so as to free said rod of any donor material present therein;

converting the so-attained polycrystalline rod into a monocrystalline state in a conventional manner;

measuring the specific resistivity of the so-produced monocrystalline rod; and

subjecting said monocrystalline rod to controlled radiation by thermal neutrons in accordance with the measured resistivity, the intensity of such controlled radiation comprising 8×10^{13} neutrons/cm^2 × sec. and the radiation duration comprising about one hour whereby an n-doped Si rod having a concentration of about 4×10^{13} atoms of phosphorous/cm^3 of silicon therein is produced.

4,042,455

PROCESS FOR DISSOLVING RADIOACTIVE CORROSION PRODUCTS FROM INTERNAL SURFACES OF A NUCLEAR REACTOR

William W. Brown, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 8, 1975, Ser. No. 575,664
Int. Cl.[2] G21C *9/00*
U.S. Cl. 176—37 5 Claims

1. The process for dissolving radioactive corrosion products from the internal surfaces of a nuclear reactor comprising the steps of:

reducing the pressure and temperature of coolant circulating in a closed nuclear reactor steam supply system to about atmospheric pressure and 140° F respectively;

continuing the circulation of said coolant to permit the release of fission gases and fission products into the circulating coolant and until the hydrogen concentration in the coolant is reduced to less than about 4cc per kg;

increasing the pressure of said coolant to several atmospheres of pressure;

adding a solution having an oxygen content greater than water to said circulating coolant to further cause the release of radioactive products from the reactor internal surfaces into said coolant;

reducing the pressure of the circulating coolant to atmospheric pressure;

passing said coolant containing said radioactive products through a demineralizer to remove said products; and

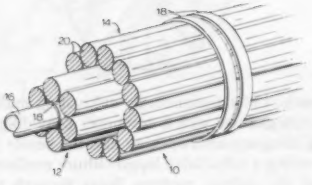
returning the thus decontaminated coolant to the reactor steam supply system.

4,042,456

NUCLEAR FUEL STRING ASSEMBLY

Anthony Kwok-Chun Ip; Ken Koyanagi, and Walter Renald Tarasuk, all of Peterborough, Canada, assignors to Canadian General Electric Company Limited, Toronto, Canada

Filed Mar. 16, 1976, Ser. No. 667,419
Int. Cl.[2] G21C *3/30*
U.S. Cl. 176—78 10 Claims



1. A nuclear fuel bundle for use in a nuclear reactor, comprising a first fuel rod sub-assembly having a first set of axially spaced annular rings with a first plurality of nuclear fuel rods integrally attached to radially inner surfaces of said first rings in annular array therein and extending in mutual parallel relation between the rings, a second fuel rod sub-assembly having a second set of axially spaced annular rings, with a second plurality of nuclear fuel rods integrally attached to radially outer surfaces of said second rings in annular array thereabout and extending in mutual parallel relation between the rings, said second sub-assembly being of smaller diameter than said first sub-assembly, having a radial clearance therefrom, and assembled coaxially in telescoped relation within the other said sub-assembly, and a plurality of hollow thimble means interposed between and supported by said first and second sub-assembly in contacting relation with the ends of said rods to locate said first fuel rods in radially and angularly spaced relation from said second fuel rods, to permit relative differentive axial expansion between said sub-assemblies.

4,042,457

PREPARATION OF TISSUE INVASION INHIBITOR AND METHOD OF TREATMENT UTILIZING THE INHIBITOR

Klaus E. Kuettner, Chicago; Reuben Eisenstein, Lincolnwood, both of Ill., and Nino Sorgente, Los Angeles, Calif., assignors to Rush-Presbyterian-St. Luke's Medical Center, Chicago, Ill.

Filed Nov. 10, 1975, Ser. No. 630,275
Int. Cl.[2] C12B *3/00*; C12K *9/00*; A61K *35/12*
U.S. Cl. 195—1.8 10 Claims

1. The method of preparing a composition of matter having activity as an inhibitor of cell proliferation comprising the steps of providing connective tissue having a high content of collagen or proteoglycans in condition for extraction, extracting said inhibitor from said tissue with an aqueous extraction medium which includes a solute which does not irreversibly denature the proteinaceous matter to be extracted, separating the resultant aqueous extract from the tissue, recovering from the aqueous extract substances having a molecular weight below about 50,000, treating the fraction of aqueous extract having a molecular weight below about 50,000 to remove salts therefrom, and dehydrating the resultant material.

4,042,458

PROCESS FOR THE PRODUCTION OF MICRO-ORGANISMS

David E. F. Harrison, and Harmannus J. Doddema, both of Faversham, England, assignors to Shell Oil Company, Houston, Tex.

Filed Mar. 10, 1976, Ser. No. 665,641
Claims priority, application United Kingdom, Mar. 14, 1975, 10745/75
Int. Cl.[2] C12B *1/00*
U.S. Cl. 195—28 R 9 Claims

1. A process for the production of micro-organisms comprising culturing, under aerobic conditions in a liquid growth medium comprising assimilable sources of nitrogen and essential mineral salts in the presence of methane gas, a methane-utilising micro-organism which is a strain of Methylococcus 999 having the NCIB Accession No. 11083 in the presence of (a) methanol-utilising micro-organisms which are capable of metabolising methanol produced by the growing methane-utilising micro-organism, and (b) non-methylotrophic micro-organisms which are capable of metabolising organic substances produced by the methane- and/or methanol-utilising micro-organisms, and recovering the micro-organisms from the liquid growth medium.

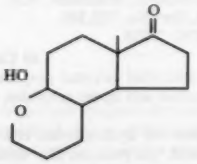
4,042,459

COMPOSITION OF MATTER AND PROCESS

John C. Knight, Kalamazoo Township, Kalamazoo County, and Merle G. Wovcha, Kalamazoo, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Nov. 17, 1975, Ser. No. 632,650
Int. Cl.[2] C07B *29/00*
U.S. Cl. 195—51 S 40 Claims

37. A process for preparing a fermentation beer containing compounds of the formulae



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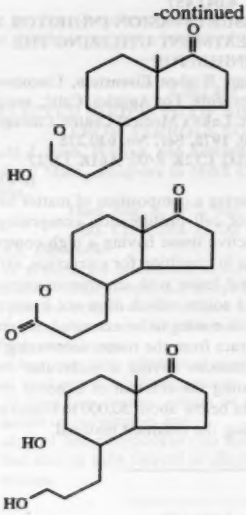


which comprises cultivating a *Mycobacterium* mutant which is characterized by its ability to selectively degrade steroids with or without a 17-alkyl side chain of from 2 to 10 carbon atoms, inclusive, and accumulate 3aα-H-4α-[3'-propanol]-7aβ-methylhexahydro-1,5-indandione hemiketal; 3aα-H-4α-[3'-propanal]-5α-hydroxy-7aβ-methylhexahydro-1-indanone hemiacetal; 3aα-H-4α-[3'-propionic acid]-5α-hydroxy-7aβ-methylhexahydro-1-indanone-δ-lactone; and 3aα-H-4α-[3'-propanol]-5α-hydroxy-7aβ-methylhexahydro-1-indanone in the fermentation beer, in an aqueous nutrient medium under aerobic conditions in the presence of a steroid with or without a 17-alkyl side chain containing from 2 to 10 carbon atoms, inclusive.

4,042,460

METHOD FOR PRODUCING GLUCOSE ISOMERASE

Ivan Verner Diers, Lille Vaerlose, Denmark, assignor to Novo Industri A/S, Bagsvaerd, Denmark

Filed July 20, 1976, Ser. No. 706,991

Claims priority, application United Kingdom, July 22, 1975, 30693/75

Int. Cl.[2] C12D *13/10*

U.S. Cl. 195—65 **9 Claims**

1. Process for production of a glucose isomerase product by fermentation, which process comprises the fermentation of a facultative aerobic, glucose isomerase producing microorganism with a supply of oxygen which is growth-limiting, and with a source of carbon and energy which represses glucose isomerase synthesis yet is readily converted anaerobically to non repressing degradation products added in slight excess and all other nutrients are added in sufficient amounts, and thereafter recovering the glucose isomerase product.

4,042,461

METHOD FOR PURIFYING CHOLESTEROL ESTERASE

Theodore Walter Esders, Webster; James Robert Schaeffer, Penfield, and Harry Wayne Harris, Hamlin, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 10, 1976, Ser. No. 722,231

Int. Cl.[2] C07G *7/028*

U.S. Cl. 195—66 R **10 Claims**

1. A method for purifying a microbial enzyme preparation having separable cholesterol esterase and lipase activities, said method comprising:

treating the enzyme preparation by hydrophobic chromatography using carboxylated polysaccharide material having attached thereto lower alkylamine with less than 8 carbon atoms to remove the separable lipase from the enzyme preparation to yield a purified cholesterol esterase preparation.

4,042,462

CREATINE PHOSPHOKINASE DETERMINATION METHOD

John H. Johnson, Kirkwood, and Lloyd E. Weeks, St. Louis, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 24, 1975, Ser. No. 644,203

Int. Cl.[2] G01N *31/14*

U.S. Cl. 195—103.5 R **8 Claims**

1. The method of determining creatine phosphokinase in blood serum or plasma comprising reacting a sample of said blood serum or plasma with an oxygenated aqueous solution containing creatine phosphate, ADP, glucose, HK, G-6-PDH, NADP and diaphorase or phenazine methosulfate electron acceptor at a temperature of from about 25° to about 40° C and a pH of from about 6 to about 7 and measuring the uptake of oxygen by the oxidation of the resulting NADPH with an oxygen sensing electrode.

4,042,463

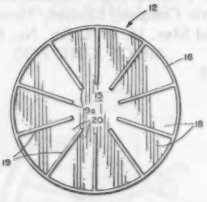
METHOD OF SIMULTANEOUSLY CULTIVATING MULTIPLE COLONIES OF MICROORGANISMS

Riaz-ul Haque, Glen Ellyn, and Richard A. Murphy, Oak Park, both of Ill., assignors to International Foundation of Microbiology, Chicago, Ill.

Continuation of Ser. No. 233,023, March 9, 1972, abandoned, which is a division of Ser. No. 412,479, Nov. 2, 1973, Pat. No. 3,912,596. This application July 25, 1975, Ser. No. 598,754

Int. Cl.[2] C12B *1/02*

U.S. Cl. 195—120 **2 Claims**



1. The method of simultaneously cultivating multiple colonies of microorganisms which comprises providing a culture dish having compartments opening into the center portion of the dish, pouring a solidifiable liquid culture medium onto the dish so that the culture medium flows through the center portion of the dish and into each of the dish compartments, allowing the liquid culture medium to solidify, contacting the solidified culture medium in each of the compartments with a colony of microorganisms, and incubating the contents of the culture dish to thereby simultaneously cultivate the multiple colonies of microorganisms.

4,042,464

METHOD FOR THE DETECTION AND MEASUREMENT OF NOXIOUS GASES

Keith F. Blurton, Yorktown, N.Y., and John M. Sedlak, Norwalk, Conn., assignors to Energetics Science, Inc., Elmsford, N.Y.

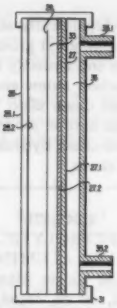
Filed Oct. 10, 1975, Ser. No. 621,554

Int. Cl.[2] G01N *27/46*

U.S. Cl. 204—1 T **4 Claims**

1. A method for electrochemically detecting a noxious gas selected from the group consisting of nitric oxide, nitrogen dioxide, sulfur dioxide, mercaptans and hydrogen sulfide in the presence of carbon monoxide which comprises the steps of (1)

feeding a gaseous sample containing said gas to the sensing electrode of an electrochemical cell comprising a sensing electrode, a counterelectrode, and an aqueous electrolyte in contact with said sensing electrode and counterelectrode, said sensing electrode comprising a carbon supported gold catalyst;

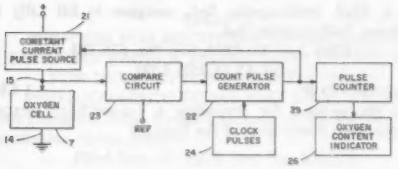


(2) maintaining said sensing electrode at a fixed potential of about 0.4 volt to 1.5 volts with respect to the potential of the reversible hydrogen couple in the electrolyte of said cell; and (3) measuring the current flowing between said sensing electrode and counterelectrode of said cell to quantitatively determine the amount of said noxious gas in said gaseous sample.

4,042,465
MEASUREMENT OF OXYGEN IN A FLUID SAMPLE AND APPARATUS THEREFOR

William H. Morong, III, Perry, Maine, and Thomas E. Lawson, Denver, Colo., assignors to Lexington Instrument Corporation, Waltham, Mass.

Filed Aug. 25, 1976, Ser. No. 717,645
Int. Cl.² G01N *27/46*
U.S. Cl. 204—1 T **11 Claims**



1. In apparatus for measuring the oxygen content of a fluid sample including a galvanic cell that absorbs the oxygen from the sample, means for measuring the oxygen absorbed by the cell comprising,

a. electrical means connected to the cell for detecting the voltage across the cell, herein called the cell voltage, and for controlling electric current to the cell, herein called the cell current, so that the cell voltage does not exceed a standard voltage,

b. means for integrating the values of the cell currents, and

c. means for indicating the value of said integration as representative of the oxygen absorbed by the cell.

11. In a method of measuring the oxygen content of a fluid sample using a galvanic cell that absorbs the oxygen from the sample, the steps of:

a. generating clock pulses of uniform interval between pulses;

b. providing a controlled source of constant current for the cell;

c. comparing cell voltage with a reference voltage producing a feedback signal when cell voltage exceeds the reference voltage;

d. combining clock pulses with the feedback signal producing cell current count pulses of uniform duration;

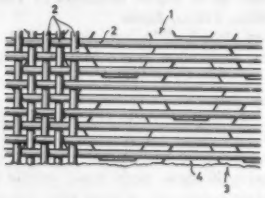
e. applying the cell current count pulses to the controlled source of constant current; whereby a pulse of constant current for the uniform duration is conducted by the cell for each applied cell current count pulse; and

f. counting the cell current count pulses.

4,042,466
METHOD FOR MANUFACTURING A METALIZED SCREEN GAUZE

Lodewijk Anselrode, St. Anthonis, Netherlands, assignor to Stork Brabant B.V., Boxmeer, Netherlands

Filed Jan. 2, 1976, Ser. No. 646,414
Claims priority, application Netherlands, Dec. 27, 1974, 7416897
The portion of the term of this patent subsequent to Aug. 1, 1989, has been disclaimed.
Int. Cl.² C25D *1/08*
U.S. Cl. 204—11 **8 Claims**

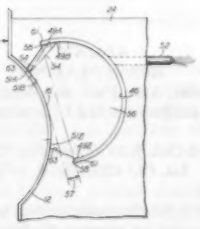


1. A method of manufacturing a seamless tubular metalized screen gauze comprising the steps of providing a matrix with an electrically conductive surface upon which is a pattern of dots of non-conductive material, tensioning a seamless tubular textile product built up of threads upon the matrix, precipitating metal upon the matrix by a galvano plastic process to anchor the threads in the precipitated metal, and removing the metal reinforced tubular product from the matrix to provide a thin tubular screen capable of use in printing while retaining its form and providing a high proportion of open area.

4,042,467
ELECTROLYTICALLY TREATING A SELECTED CYLINDRICAL SURFACE OF AN ARTICLE

Duane E. Bacon; J. David Gattermeir, both of Lee's Summit; Spencer S. Hecox, Raytown, and John J. Robb, Independence, all of Mo., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Oct. 4, 1976, Ser. No. 729,437
Int. Cl.² C25D *5/02, 17/12, 17/14*
U.S. Cl. 204—15 **10 Claims**



1. A method of electrolytically treating a cylindrical surface portion of an article with a controlled distributional profile of electrolytic treating action along a section perpendicular to a cylindrical axis of the surface portion, which comprises:

placing the article opposite an electrode of the treating apparatus; locating with respect to a surface of the electrode, typical unit areas of the surface of the article lying adjacent each other along the section in accordance with influence numbers for each of the unit areas, the influence numbers having magnitudes in proportion to the desired extent of the treating action on the unit areas to which such numbers relate, each number being the sum of ratios of incremental areas of the surface of the electrode divided by the respective distances from such incremental areas to the one unit areas associated with the number, summed over the surface of the electrode;

introducing a electrolyte in the space between the article and the electrode; and

applying a voltage between the electrode and the surface portion of the article to initiate the desired treating action.

4,042,468

PROCESS FOR ELECTROLYTICALLY COLORING ALUMINUM AND ALUMINUM ALLOYS

Mutsuo Hasegawa, Uozu; Kazuo Aikawa, and Shinji Hayashi, both of Toyama, all of Japan, assignors to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 3, 1976, Ser. No. 663,561
Claims priority, application Japan, Mar. 6, 1975, 50-26519
Int. Cl.[2] C25D *11/22*
U.S. Cl. 204—42 **6 Claims**

1. A process for electrolytically coloring aluminum or aluminum alloy which comprises anodizing a desired basis metal, electrolyzing the anodized basis metal by use of substantially direct current with the basis metal made anodic in an acidic aqueous electrolyte containing at least two coloring metallic salts in an amount of about 5 to 500 grams per liter, and further electrolyzing the basis metal in the same electrolyte by use of alternating current.

4,042,469

PROCESS FOR ELECTROLYTICALLY COLORING ALUMINUM AND ALUMINUM ALLOYS IN GOLD

Mutsuo Hasegawa, Uozu; Toshikazu Imaoka, Kurobe, and Kazuo Aikawa, Toyama, all of Japan, assignors to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 3, 1976, Ser. No. 663,625
Claims priority, application Japan, Mar. 5, 1975, 50-26066
Int. Cl.[2] C25D *11/22*
U.S. Cl. 204—42 **5 Claims**

1. A process for electrolytically coloring aluminum or aluminum alloy a gold color which comprises anodizing a basis metal, and electrolyzing the anodized basis metal in an acidic aqueous electrolyte by use of alternating current, said electrolyte beng prepared by adding formaldehyde in a concentration of about 3 to 50 grams per liter, and a thiosulfate in a concentration of about 0.3 to 10 grams per liter to an acid solution of stannous sulfate in a concentration of at least about 1.5 grams per liter.

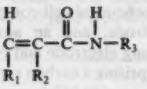
4,042,470

BRASS PLATING

Edward P. Harbulak, Allen Park, and Ronald J. Lash, Warren, both of Mich., assignors to M&T Chemicals Inc., Greenwich, Conn.

Filed Oct. 4, 1976, Ser. No. 729,024
Int. Cl.[2] C25D *3/56, 3/58*
U.S. Cl. 204—44 **8 Claims**

5. A composition for electrodepositing semi-bright to bright brass which comprises an aqueous alkaline cyanide brass electroplating bath containing at least one copper compound providing copper ions, at least one zinc compound providing zinc ions, and as a cooperating additive 0.1 to 10 grams per liter of at least one compound exhibiting the following generalized structural formula:



where

R_1 and R_2 are each independently selected from the group consisting of hydrogen, alkyl groups exhibiting from one to ten carbon atoms and hydroxy alkyl groups exhibiting from one to ten carbon atoms and R_3 is hydrogen or a straight or branched chain alkyl sulfonic or carboxylic acid from one to ten carbon atoms, or salts thereof, or a straight or branched chain hydroxy alkyl group of from one to five carbon atoms.

4,042,471

PROCESS FOR ELECTROLYTICALLY COLORING ALUMINUM AND ALUMINUM ALLOYS

Mutsuo Hasegawa, Uozu; Kazuo Aikawa, Toyama, and Katsuyuki Nagata, Uozu, all of Japan, assignors to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 3, 1976, Ser. No. 663,551
Claims priority, application Japan, Mar. 5, 1976, 51-26065
Int. Cl.[2] C25D *11/22*
U.S. Cl. 204—58 **2 Claims**

1. A process for electrolytically coloring aluminum or an aluminum alloy which comprises electrolyzing anodized aluminum or an aluminum alloy in an acidic, aqueous electrolyte containing at least two coloring metallic salts in the range of from about 5 to 500 grams per liter and a strong reducing compound selected from the group consisting of dithionites, thiosulfates, thioglycolic acid, and thioglycolates in the range of from about 0.05 to 10 grams per liter at an alternating current potential of up to 15 volts.

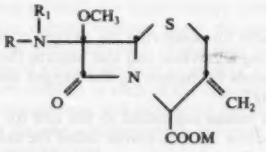
4,042,472

ELECTROLYTIC PROCESS FOR 7-METHOXY-3-EXOMETHYLENECEPHAM COMPOUNDS

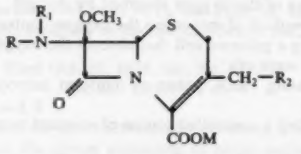
David A. Hall, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Apr. 12, 1976, Ser. No. 676,183
Int. Cl.[2] C25B *3/00*
U.S. Cl. 204—73 R **1 Claim**

1. In the process for preparing a 7-α-methoxy-3-exomethylenecepham compound of the formula

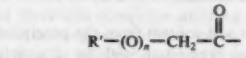


which comprises the electrolysis at a temperature between 5° and 45° C. of an aqueous solution of a 7-α-methoxy-substituted-cephalosporin compound of the formula



wherein said electrolysis is carried out at a cathode selected from the group consisting of mercury and zinc, and

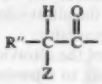
wherein R is C_1–C_4 alkanoyl, 5-amino-5-carboxyvaleryl, or benzoyl, or an aralkanoyl or aryloxyalkanoyl group of the formula



wherein R′ is phenyl, phenyl substituted by C_1–C_4 alkyl, C_1–C_4 alkoxy, halogen, amino, hydroxy; or R′ is thienyl, furyl, imidazolyl, oxazolyl, thiazolyl, triazolyl, or tetrazolyl;

and wherein *n* is 0 or 1; with the limitation that when *n* is 1, R′ is phenyl or substituted phenyl;

or R is an α-substituted aralkanoyl group of the formula



wherein R″ is phenyl, phenyl substituted by C_1–C_4 alkyl, C_1–C_4 alkoxy, halogen, amino, or hydroxy, or R″ is thienyl or furyl;

Z is amino, hydroxy, formyloxy, or C_2–C_4 alkanoyloxy,

R_1 is hydrogen or R_1 and R taken together with the nitrogen atom to which they are attached are succinimido or phthalimido;

R_2 is acetoxy, halogen, pyridinium, carbamoyloxy, or a group of the formula

wherein R_3 is C_1–C_4 alkyl, C_1–C_4 alkoxythionocarbonyl, C_1–C_4 alkanoyl, benzoyl, thiocarbamoyl, amidino or a 5- or 6-membered nitrogen containing heterocyclic ring;

and M is hydrogen, an alkali metal cation, and a unit negative charge when R_2 is pyridinium or when R_3 is amidino;

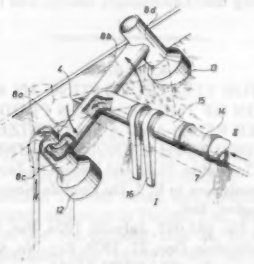
the improvement which comprises carrying out the electrolysis at a pH of about 7.5 to about 8.5 at a potential above the reduction potential of said cephalosporin compound.

4,042,473

PROCESS FOR RECOVERY OF RE-USABLE SUBSTANCES FROM A FIXING BATH IN PROCESSES FOR DEVELOPMENT AND FIXING OF PHOTOGRAPHIC FILMS AND X-RAY FILMS

Osten Lindgren, Solna, Sweden, assignor to AB Metall- & Bergprodukter, Solna, Sweden

Filed Nov. 17, 1975, Ser. No. 632,274
Claims priority, application Sweden, Dec. 4, 1974, 7415216
Int. Cl.² C25C *1/20*
U.S. Cl. 204—109 **5 Claims**



1. A process for electrolytic recovery of silver from fixing bath solution obtained by development of photographic films and X-ray films in a recovery apparatus having separate first and second chambers, said process being performed alternatively in two modes, each mode respectively occurring in said first and second chambers, said process comprising the steps of:

feeding fixing bath solution to said first chamber;

electrolytically recovering silver from said solution in the first chamber while simultaneously directing additional solution from the fixing bath to said second chamber which functions as a holding tank;

automatically discharging the liquid from said first chamber to a sewer upon completion of the recovery of silver from the fixing bath solution;

electrolytically recovering silver from the fixing bath solution in said second chamber by subjecting the solution in said second chamber to a shorter and weaker electrolysis than that to which the solution in the first chamber is subjected, while simultaneously directing additional solution from the fixing bath to said first chamber which now functions as a holding tank; and

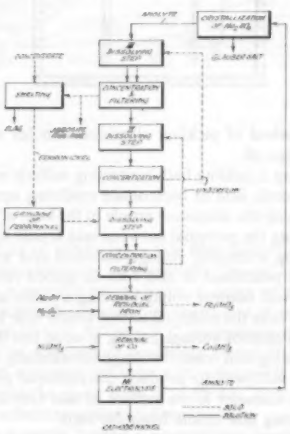
automatically discharging the liquid from said second chamber to a chemicals tank upon completion of the recovery cycle, such that the chemicals in the solution discharged from said second chamber to said chemicals tank are not extensively decomposed, and such that said solution discharged from said second chamber to said chemicals tank still contains some silver.

4,042,474

SEPARATING NICKEL, COBALT AND CHROMIUM FROM IRON IN METALLURGICAL PRODUCTS

Heimo Unto August Saarinen, Huovintie, Finland, assignor to Pako Corporation, Minneapolis, Minn.

Continuation of Ser. No. 385,183, Aug. 2, 1973, abandoned, which is a continuation-in-part of Ser. No. 334,870, Feb. 22, 1973, abandoned. This application June 26, 1975, Ser. No. 590,478
Int. Cl.² C25C *1/06*
U.S. Cl. 204—112 **6 Claims**



1. A process for separating one or more non-ferrous metals selected from the group consisting essentially of nickel, cobalt and chromium from iron by treatment of a metallurgical product consisting essentially of at least one of ferronickel, ferrocobalt and ferrochromium in addition to sulfur, carbon or silicon, comprising in combination:

leaching the metallurgical product counter-currently in at least two steps with dilute sulfuric acid to a final pH in a last one of said leaching steps of 5.5 to 6.2 in admixture with oxygen for oxidizing iron to form ferric hydroxide and dissolve the non-ferrous metals to form a pregnant leach solution in the first of said leaching steps and separating solid material containing undissolved non-ferrous

metal or metals and said ferric hydroxide from said last leaching step;

b. then adding to the solid material from said last leaching step of (a) sulfuric acid solution to dissolve the non-ferrous metal or metals and the ferric hydroxide and precipitating iron as alkali jarosite in the presence of alkali metal ions at elevated temperature under oxidizing conditions, using copper as an oxidation catalyst;

c. maintaining the temperature of the acid solution formed in step (b) above about 90° C and the pH for step (b) between 1 and 3.5; and

d. finally separating the alkali jarosite precipitate from the solution containing the non-ferrous metal or metals and feeding said solution to the last leaching step of (a).

5. The process of claim **1** wherein the non-ferrous metal is nickel and including purification of the solution from step (d), treating the purified solution by nickel electrolysis and recirculating acid electrolyte from said electrolysis to step (a).

4,042,475

PICKLING OF ALUMINUM

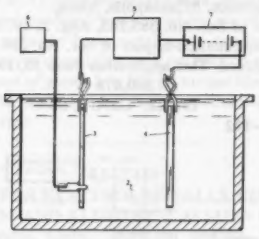
Paul Frederik A. Bijlmer, Nieuw-Vennep, Netherlands, assignor to Fokker-VFW B.V., Schiphol, Netherlands

Filed Apr. 7, 1976, Ser. No. 674,445

Claims priority, application Netherlands, Apr. 9, 1975, 7504244

Int. Cl.[2] C25F *1/00, 1/04, 7/00*

U.S. Cl. 204—141.5 **8 Claims**



1. The method of pickling aluminum articles which comprises the steps of:

a. providing a pickling bath containing sulfuric acid without any chromic acid or bichromate oxidizing agent;

b. positioning the aluminum article in the bath of step (a) and measuring the potential between said article and the bath;

c. imposing a control voltage between said article and a cathode positioned in said bath in spaced relation to the article, said control voltage having a value at least sufficient to raise the potential of said article near to zero volts but said control voltage having a value less than 1 volt;

d. maintaining said control voltage substantially constant for a time sufficient to produce microscopic pits of about 200μ in diameter in the surface of said article; and then

e. recovering said article from the bath.

4,042,476

POLYMERIZED TITANIUM DIOXIDE FOR ULTRAVIOLET COATINGS

George L. Collins, Murray Hill, and John R. Costanza, North Plainfield, both of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Feb. 18, 1975, Ser. No. 550,383

Int. Cl.[2] C08F *8/00;* **C08L** *7/00;* **B01J** *1/10*

U.S. Cl. 204—159.15 **9 Claims**

1. A process for ultraviolet coating which comprises:

a. forming an aqueous polymer emulsion of alpha beta ethylenically unsaturated vinyl polymerizable monomers utilizing a free radical initiator and up to about 20 percent, by weight, based on the solids content of the formed emulsion, of titanium dioxide;

b. precipitating the resulting polymer emulsion utilizing an organic solvent having a boiling point of less than about 70° C;

c. removing water and solvent from the precipitate;

d. mixing the dried precipitate with an ultraviolet curable binder in the precipitate to binder ratio, by weight, of about 2–1 to 1–5, wherein said binder contains about 40 to about 100 percent, by weight, of an alpha beta ethylenically unsaturated vinyl polymerizable compound containing at least two sites of alpha beta ethylenic unsaturation and up to about 60 percent, by weight, of an alpha beta ethylenically unsaturated vinyl polymerizable monomer containing no more than one site of alpha beta ethylenic unsaturation, and about 0.1 to about 15 percent, by weight, based upon the ultraviolet curable components, of an ultraviolet photoinitiator;

e. applying a coating of the ultraviolet curable mixture; and

f. subjecting the coating to ultraviolet light.

4,042,477

METHOD OF CONTINUOUS AND DISCONTINUOUS ELECTROCHEMICAL CLEANING OF ALLOYED STEEL WITH SURFACES CONTAMINATED WITH MINERAL OILS AND SYNTHETIC OILS

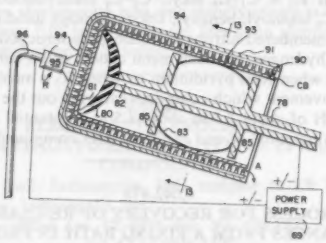
Bengt Ivar Andersson, Karlstad, Sweden, assignor to C. J. Wennberg AB, Karlstad, Sweden

Filed May 10, 1976, Ser. No. 684,887

Claims priority, application Sweden, May 13, 1975, 054791

Int. Cl.[2] C25F *1/00, 1/06*

U.S. Cl. 204/145 R **10 Claims**



1. Method of continuous and discontinuous electrochemical cleaning of alloyed steel, contaminated with mineral oils and synthetic oils while preserving or improving the finish, characterized in that the steel surface is subjected to a combined degreasing and surface degradation by means of a direct current electrochemical treatment in an aqueous solution containing more than 25 g./l. potassium sulphate with a pH exceeding 10, said surface being made alternately anodic and then cathodic.

4,042,478

PROCESS FOR ELECTROCOATING AN AQUEOUS COMPOSITION OF THE REACTION PRODUCT OF AN EPOXY ESTER RESIN AND A MALEINIZED DRYING OIL BLENDED WITH A CROSS-LINKING AGENT

Isidor Hazan, Clementon, N.J., and Robert N. Iacona, Newtown Square, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 493,067, July 30, 1974, Pat. No. 3,954,688. This application Dec. 22, 1975, Ser. No. 643,389

Int. Cl.[2] C25D *13/06*

U.S. Cl. 204—181 **6 Claims**

1. In the process for electrocoating a film-forming polymer composition on the anode of an electrocoating cell, said anode consisting of a metal article, by immersing said anode in a

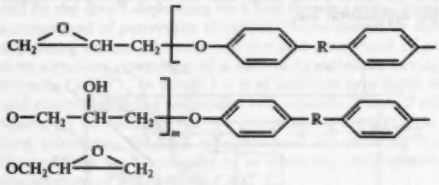
coating bath containing uniformly dispersed constituents, passing direct current through said cell to deposit a coating on the anode, removing the coated anode from the bath and baking the coated anode to form a continuous film thereon, the improvement therewith comprises utilizing a coating bath of

an aqueous coating composition having a pH of about 7.2–10 comprising 5–50% by weight of film-forming constituents uniformly dispersed in an aqueous medium;

wherein the film-forming constituents consist essentially of

a. 50–97% by weight, based on the weight of the film-forming constituents, of a polymer which is the reaction product of

1. an epoxy ester resin of an epoxy resin of the formula



where R is an alkylene group having 1–4 carbon atoms and m is a positive integer sufficiently large to provide a Gardner Holdt viscosity of A to Z_5 measure at 25° C. on a 40% weight solids polymer solution using ethylene glycol monobutyl ether solvent; and drying oil fatty acids selected from the group consisting of linseed oil fatty acids, tung oil fatty acids, dehydrated castor oil fatty acids, soya oil fatty acids and tall oil fatty acids; and

2. a malenized drying oil which is the reaction product of maleic anhydride and a drying oil selected from the group consisting of linseed oil, tung oil, dehydrated caster oil, soya oil and tall oil; and

b. 3–50% by weight, based on the weight of the film-forming constituents, of a water dispersible cross-linking agent selected from the group consisting of phenol formaldehyde, urea formaldehyde, methylated urea formaldehyde, melamine formaldehyde, alkylated melamine formaldehyde having 1–4 carbon atoms in the alkyl group and benzoguanamine formaldehyde;

wherein the composition contains sufficient basic compound to have said pH and wherein the basic compound is selected from the group consisting of an alkali metal hydroxide, an amine or a polyamine.

4,042,479

THIN FILM RESISTOR AND A METHOD OF PRODUCING THE SAME

Jun'ichiro Yamazaki; Takeshi Kamo, and Yoshiichi Saito, all of Kawasaki, Japan, assignors to Fujitsu Ltd., Kawasaki, Japan

Continuation of Ser. No. 532,680, Dec. 13, 1974, abandoned. This application Sept. 14, 1976, Ser. No. 723,310

Claims priority, application Japan, Dec. 27, 1973, 48-1927

Int. Cl.[2] *C23C 15/00;* **H01B** *1/00;* **H01C** *7/00*

U.S. Cl. 204—192 F **3 Claims**

1. A thin film resistor of essentially Ta—Al—N composition having a specific resistivity in the range of from 400 to 1000μΩcm, a temperature coefficient of resistivity in the range of from 0 to −300 ppm/° C, and a characteristic of resistivity change in ageing of less than 2000 ppm, wherein said thin film resistor is produced by a process comprising the steps of:

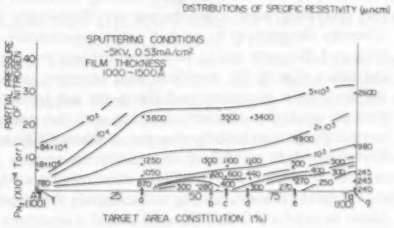
providing an atmosphere consisting essentially of nitrogen at a partial pressure in the range from 2×20^{-4} to 10×10^{-4} Torr. and an inert gas;

placing a substrate within said atmosphere;

providing a target having a composition consisting essentially of tantalum and aluminum, said target composition including said tantalum covering the surfaces of said target within the range of from 30 to 80%, and;

performing a sputtering process on said target within said atmosphere to form said thin film resistor having a thickness in the range from 300 to 1500A under conditions which cause said formed thin film resistor to have said specific resistivity and said temperature coefficient or resistivity within said corresponding ranges; and

heat treating said formed thin film resistor at a temperature of not more than 250° C to cause said thin film resistor to have said characteristic of resistivity change in ageing within said range.



2. A method of producing a thin film resistor, with a high degree of reproductivity, of essentially Ta—Al—N composition having a specific resistivity in a range of from 400 to 1000μΩcm, a specific temperature coefficient of resistance in a range of from 0° to −300 ppm/° C, comprising the steps of:

providing an atmosphere consisting essentially of an inert gas, and nitrogen, wherein said nitrogen is at a partial pressure in the range from 2×10^{-4} to 10×10^{-4} Torr;

placing a substrate within said atmosphere;

providing a target having a composition consisting essentially of tantalum and aluminum, said target composition including said tantalum covering the surface of said target within the range of from 30 to 80%;

performing a sputtering process on said target within said atmosphere to form said thin film resistor having a thickness in the range of from 300 to 1500A under the sputtering condition so that said thin film resistor exhibits a plateau characteristic in a plot of said temperature coefficient of resistance versus nitrogen partial pressure in said nitrogen partial pressure range; and

heat treating said formed thin film resistor at a temperature of not more than 250° C to provide said thin film resistor with a stabilized specific resistance change in ageing characteristic of less than 2000 ppm.

4,042,480

APPARATUS FOR SELECTIVELY APPLYING A METAL COATING TO THE METALLIC PARTS OF ELEMENTS WHICH PASS THROUGH AN INSULATOR

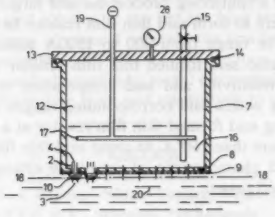
Francis X. Noz, Matachils 400, Triesen, Switzerland

Division of Ser. No. 512,398, Oct. 4, 1974, Pat. No. 4,007,097. This application Apr. 6, 1976, Ser. No. 674,269

Claims priority, application Switzerland, Oct. 4, 1973, 14213/73

Int. Cl.[2] C25D *17/06, 17/18, 17/28*

U.S. Cl. 204—224 R **5 Claims**



1. An apparatus for selectively applying a coating of a precious metal such as gold, to the metal parts of electrical components of a type having a housing in which electrical connectors have ends protruding through the sides thereof, comprising:

an electrically insulated template having apertures therein for receiving said components in fluid-tight fashion whereby the parts to be coated project outwardly on one side, and the parts not to be coated project outwardly on the other side of the template, said template comprising the wall of a container and the parts not to be coated project inwardly of said container and the parts to be coated project exteriorly thereof, a chemically inactive first electrolyte partially filling said container,

means for rendering said container substantially airtight,

vacuum means for evacuating sufficient air from said container to produce a vacuum to hold said connectors to said template while said container is in said first position such that the first elctrolyte is not in contact with said connectors,

said container being invertible from a first position to a second position,

whereby when said container is inverted to said second position the first electrolyte comes into contact with said parts not to be coated,

a second electrolyte which partially receives the parts to be coated when said container is in said second position,

a first electrode in electrical contact with said second electrolyte, a second electrode in electrical contact with said first electrolyte, and means for connecting said first and second electrodes to a current source.

4,042,481

PRESSURE-ELECTROLYSIS CELL-UNIT

Donald A. Kelly, 58-06 69th Place, Maspeth, N.Y. 11378

Filed Dec. 24, 1974, Ser. No. 536,268

Int. Cl.[2] C25B *1/02, 1/12, 11/03*

U.S. Cl. 204—270 **9 Claims**

1. An advanced pressure electrolysis cell and unit comprising a sealed rectangular process tank containing a top insulation plate,

securing and sealing means for said sealed rectangular process tank and said top insulation plate,

multiple equal sets of anode and cathode porous tubular electrodes uniformly secured and sealed at right angles within said top insulation plate, each set comprising one anode and one cathode,

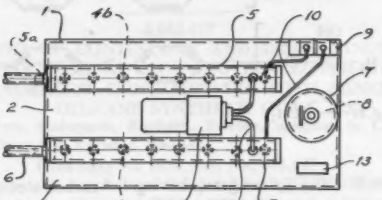
a sub-surface plastic hydrophobic layer uniformly disposed over each of said multiple equal sets of anode and cathode porous tubular electrodes,

two horizontal gas manifold tubes secured and sealed to the tops of each said multiple equal sets of anode and cathode porous electrodes, one of said manifold tubes being sealed to the anodes and the other of said manifold tubes being sealed to the cathodes,

sealing means uniformly provided for each of said multiple equal sets of anode and cathode porous tubular electrodes between said top insulation plate and said two horizontal gas manifold tubes.

plug sealing means at one end of said two horizontal gas manifold tubes, sealing and gas connection plugs secured to the opposite ends of said two horizontal gas manifold tubes,

tubing connection means disposed between said two sealing and gas connection plugs and the hydrogen and oxygen gas application use,



a vertical cylinder secured and sealed at one end of said top insulation plate in fluid communication with said sealed rectangular process tank,

a vertically movable piston-weight closely fitted within said vertical cylinder secured and sealed at one end of said top insulation plate, a vertical extension tube centrally located within said vertically movable piston-weight,

a fluid control valve located at the top of said vertical extension tube,

a drain petcock built into the lower side of said sealed rectangular process tank,

a pressure gauge fitted and sealed into said top insulation plate,

electrical connections from an external low-voltage D. C. power supply source to a terminal block secured to the top of said top insulation plate,

insulated electrical connection leads from the positive and negative terminals on said terminal block to the tops of each of said multiple equal sets of anode and cathode porous tubular electrodes-respectively.

4,042,482

SUBSTITUTED LITHIUM ORTHOSILICATES AND SOLID ELECTROLYTES THEREFROM

Robert Day Shannon, Wilmington, and Barry Edward Taylor, Claymont, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 651,585, Jan. 22, 1976, abandoned. This application Aug. 26, 1976, Ser. No. 718,031

Int. Cl.[2] C25B *9/00;* **C01B** *33/26;* **H01M** *10/36*

U.S. Cl. 204—242 **13 Claims**

1. A composition having

a. the formula

$$Li_{4+w-x-2y}Si_{1-w-x-y}Al_wP_xS_yO_4$$

wherein

w is 0 to about 0.45,

x is 0 to about 0.5, and

y is 0 to about 0.35,

with the proviso that one or both of w or $x+2y$ is at least about 0.1, and

b. the monoclinic Li_4SiO_4 crystal structure.

4,042,483

ELECTROLYSIS CELL ELECTRODE AND METHOD OF PREPARATION

Pierre Bouy, Enghien-les-Bains, and Guy Cheradame, Pont-de-Claix, both of France, assignors to Rhone-Progil, Paris, France

Continuation of Ser. No. 486,052, July 5, 1974, abandoned. This application Nov. 21, 1975, Ser. No. 634,140

Claims priority, application France, July 20, 1973, 73.26693; May 13, 1974, 74.16409

Int. Cl.[2] C25B *11/08;* C25C *7/02;* C25D *17/10*

U.S. Cl. 204—290 F 13 Claims

1. A process for preparing an electrode for an electrolysis cell by the direct depositing on a film-forming metal substrate, a compound of perovskite structure, characterized by directly depositing on the said substrate the said compound of perovskite structure consisting of a rare earth cobaltite having the formula $LnCoO_3$, in which Ln is at least one rare earth metal, said compound being suspended in a solution of cobalt nitrate, which, by thermolysis, may be converted to cobalt oxide, and then subjecting the said substrate and the resulting deposit thereon to a heat treatment in an oxidizing atmosphere at a temperature of at least about 300° C.

12. An electrode for an electrolysis cell produced by the process of claim 1.

4,042,484

METAL ANODE FOR ELECTRO-CHEMICAL PROCESSES

Gerhard Thiele, Uttenreuth; Dieter Zollner, Schwaig, and Konrad Koziol, Rothenbach, all of Germany

Continuation-in-part of Ser. No. 299,140, Oct. 19, 1972, abandoned, which is a continuation-in-part of Ser. No. 98,227, Dec. 15, 1970, abandoned. This application Jan. 10, 1975, Ser. No. 540,173

Int. Cl.[2] C25B *11/08*

U.S. Cl. 204—290 F 16 Claims

1. In an anode structure for use in electrochemical processes comprising a basis metal and a cover layer thereon the improvement wherein said cover layer comprises a compound having the empirical formula

$$M_nPt_3O_4$$

where M is selected from the group of monovalent elements consisting of lithium, sodium, potassium, silver, and copper and wherein n is a number in the range of about 0.4 to about 0.6.

4,042,485

COMBUSTON METHOD OF OIL SHALE RETORTING

John B. Jones, Jr., 300 Enterprise Building, Grand Junction, Colo. 81501, and Adam A. Reeves, P.O. Box 781, Anvil Points, Rifle, Colo. 81650

Filed Apr. 16, 1976, Ser. No. 677,556

Int. Cl.[2] C10G *1/02*

U.S. Cl. 208—11 R 5 Claims

1. A process for retorting oil shale in a direct combustion heating mode in a vertical vessel for producing shale oil and gas above 95% liquid recovery efficiency based on a Fischer Assay comprising:

a. forming a bed of shale under a gravity flow in a closed, vertical kiln in a mass flow rate of 450–500 pounds per square foot per hour in a continuous flow, said raw shale being in a particulate size range consist of + ¾ inch to −3 inch;

b. feeding particulate raw shale at ambient temperatures onto the top of the shale bed at said mass flow rate and withdrawing sufficient retorted shale from the bottom of the bed so as to maintain a bed of about 26' in depth, said retorted shale being withdrawn at a temperature of about 300°–400° F.;

c. injecting air heated to about 180°–200° F. into said bed at a rate of about 4,000 to 4,800 standard cubic feet per shale ton, said air being introduced at two positions across the lateral extent of said bed, the first said position being at about 6–7 feet below the top surface of the bed, and the second position being at about 12–13 feet below the surface of the bed and the two positions being in a ratio of about 2–1 to 5–1 volumes of air respectively of said first to said second positions;

d. injecting an essentially inert gas at a temperature of about 150°–240° F. into said bed at a rate of 13,000 to 16,000 standard cubic feet per shale tone, said gas being injected into said first position being mixed with air therein, into said second position being mixed with air therein and through the bottom of said bed as a third position for passing upwardly through the shale bed, and the ratio being about 1 to 1 to 8 volumes respectively;

e. the heat for the retorting of the shale being provided by combustion at temperatures of from 900°–1100° F. in a zone about 1–3 feet above the first position and about 900°–1050° F. about 1–2 feet above the second position; and

f. withdrawing a mixture of gas and shale oil mist from an upper part of the bed for recovery of liquid and gas therefrom.

4,042,486

PROCESS FOR THE CONVERSION OF PITCH INTO CRYSTALLOIDAL PITCH

Kiro Asano, Kakizaki; Humio Tamura, Hino; Tsuyoshi Saito, Tokyo, and Yoshio Kawai, Tokyo, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 588,024, June 18, 1975, abandoned, Continuation-in-part of Ser. No. 589,592, June 23, 1975, abandoned. This application Mar. 10, 1976, Ser. No. 665,620

Claims priority, application Japan, June 24, 1974, 49-71257

Int. Cl.[2] C10C *3/00*

U.S. Cl. 208—44 22 Claims

1. A process for converting pitch to a crystalloid, which process comprises:

a. providing a bed of solid amorphous pitch particles, said particles being not more than 5 mm in cross-sectional equivalent diameter, said bed having a gas void space of not less than 30% by volume;

b. treating the surfaces of said pitch particles in said bed by coating, oxidation or solvent extraction to reduce susceptibility to cohesion; and

c. contacting said particles in said bed with a hot non-oxidative gas to heat said particles to a temperature within the range of from 350°–550° C and convert the pitch to the crystalloidal state.

4,042,487

METHOD FOR THE TREATMENT OF HEAVY PETROLEUM OIL

Koji Seguchi, Hino; Minoru Sugita; Kazuyoshi Inada, both of Tokyo; Kiyoshi Tagaya, Funabashi, and Yuji Nakamura, Tokyo, all of Japan, assignors to Kureha Kagako Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 6, 1976, Ser. No. 683,925

Claims priority, application Japan, May 8, 1975, 50-55749

Int. Cl.[2] C10G *9/16*

U.S. Cl. 208—48 R 8 Claims

6. In a process for the thermal cracking, in a tubular type heating furnace, of a heavy petroleum oil having an API specific gravity of not more than 25, the improvement comprising:

a. mixing the heavy petroleum oil feed to the furnace with 0.5 to 5% by weight of a particulate inorganic substance

having a surface area of not less than $30m^2/g$ and an average particle diameter of not more than 30 microns, said inorganic substance being obtained by alkali treatment of an inorganic material containing, as its principal components, a high melting oxide and an iron oxide; and

b. applying a magnetic field of from 1,000 to 5,000 gausses transversely to the flow of the mixed feed of the heavy petroleum oil and particulate substance being introduced into the furnace and simultaneously applying a direct current of 50 mA to 3A parallel to said mixed feed flow.

4,042,488

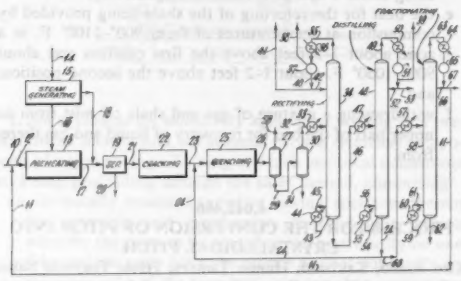
THERMAL CRACKING WAX TO NORMAL ALPHA-OLEFINS

Jerry C. Perciful, Groves, Tex., assignor to Texaco Inc., New York, N.Y.

Continuation-in-part of Ser. No. 411,550, Oct. 31, 1973, abandoned. This application Oct. 23, 1975, Ser. No. 625,351

Int. Cl.[2] C07C *3/30*; C10G *9/36*

U.S. Cl. 208—102 **14 Claims**



1. The method of preparing n-alpha olefins containing 6-18 carbon atoms which comprises

preheating and vaporizing a charge hydrocarbon wax stock to thermal cracking temperature;

passing said charge hydrocarbon wax stock during said preheating and vaporizing operation through the intermediate temperature range of 625° F–800° F in a time less than about 8 seconds whereby the desired product contains a decreased porportion of paraffin impurities;

thermally cracking said preheated charge wax stock in vapor phase at inlet temperatue of 600° F–800° F in the presence of steam at thermal cracking conditions thereby forming a product stream cracking effluent containing desired product n-alpha olefins containing 6–18 carbon atoms together with decreased proportion of paraffin impurities;

withdrawing said product stream cracking effluent at 1050° F–1250° F;

separating said desired product n-alpha olefins containing 6–18 carbon atoms from said product stream cracking effluent; and

maintaining the Severity Value of said product stream cracking effluent during said separating less than about 66.5.

4,042,489

METHOD FOR REDUCING CATALYST PARTICLE EMISSIONS IN FLUIDIZED CATALYTIC CRACKING PROCESSING

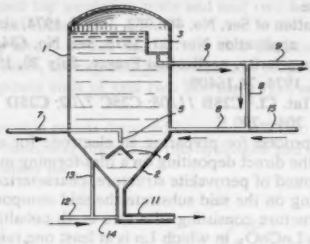
Robert J. Fahrig, Lansing, and Terry W. Timm, Libertyville, both of Ill., assignors to Standard Oil Company, Chicago, Ill.

Filed Sept. 2, 1976, Ser. No. 719,891

Int. Cl.[2] C10G *11/18*

U.S. Cl. 208—152 **7 Claims**

1. In a process for fluidized catalytic cracking wherein feed and a finely divided catalyst are contacted in a reaction zone at fluidized cracking conditions to effect formation of cracked products, wherein cracked products containing entrained catalyst are separated from spent catalyst and passed into a fractionation column wherein a high boiling bottoms stream from said column containing said entrained catalyst is passed to a settling zone from which is recovered an overhead decanted oil and a bottoms slurry oil the latter containing at least a portion of said entrained catalyst wherein said slurry oil is recycled to the reaction zone, and where said spent catalyst is contacted at regeneration conditions with an oxygen containing gas in a regeneration zone to burn coke off said catalyst



forming effluent regeneration gases wherein an improvement comprises reducing emission of catalyst fines from said effluent regeneration gases while minimizing total catalyst losses in the process by recycling to said settling zone at least a portion of said decanted oil at conditions including regulation of rate of recycle of decanted oil to maintain the upward velocity of fluid in said settling zone at a rate so as to reject from said settling zone in said decanted oil catalyst particles of less than about 20 microns diameter.

4,042,490

HYDROCARBON UPGRADING PROCESS

Robert M. Suggitt, Wappingers Falls, and Walter C. Gates, Jr., Newburg, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 26, 1973, Ser. No. 428,638

Int. Cl.[2] C10G *23/02, 23/04*

U.S. Cl. 208—264 **21 Claims**

1. In a process for selectively converting a mixture of n-paraffin and oxygenated n-paraffin by-products, said n-paraffin and by-products having from 6 to 30 carbon atoms, to a substantially pure n-paraffin recycle feedstock by catalytically hydrogenating said mixture and converting said oxygenated n-paraffin by-products to the corresponding n-paraffin, the improvement which comprises catalytically hydrogenating said mixture in the absence of substantial isomerization and hydrocracking at a temperature of from about 600° to 750° F. in the presence of a catalyst composed of alumina, from about 0.1 to 5.0 weight percent of a Group VIII metal and from about 0.05 to 2.0 weight percent of an alkali metal oxide or alkaline earth metal oxide or thallous oxide or mixtures thereof impregnated on said alumina to convert said by-products to n-paraffins.

4,042,491

COLOR RECOGNITION SYSTEM

Barrett Hazeltine; Edgar De Meo, both of Providence, R.I., and Richard M. Simon, Dix Hill, N.Y., assignors to U.S. Billiards, Inc., Amityville, N.Y.

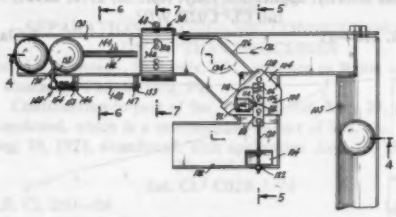
Filed Oct. 6, 1975, Ser. No. 619,896

Int. Cl.[2] B07C *5/342*

U.S. Cl. 209—74 R **6 Claims**

1. In combination with a pool table, a ball separating system for distinguishing between an entirely white cue ball and object balls, and for separating the cue balls from the object ball comprising a housing having a sensing station, at least two collecting stations positioned downstream of said sensing station and a diverting station positioned between said sensing

station and said collecting stations, a plurality of light-emitting devices mounted at the sensing station for directing light toward a ball as the ball passes the sensing station, a plurality of light detectors mounted at the sensing station in cooperation with said light-emitting devices for receiving light reflected from the ball as the ball passes the sensing station and providing an output signal indicative of the amount of reflected light,



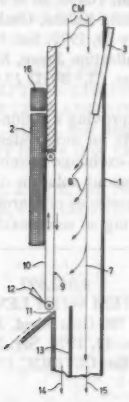
means coupled to receive the output from said light detectors for providing a first electrical signal when a cue ball passes the sensing station, and a second electrical signal when an object ball passes the sensing station, a pivot member positioned in the diverting station and operative in response to said electrical signals to divert a cue ball into a first collecting station and the object ball into a second collecting station.

4,042,492

APPARATUS FOR THE SEPARATION OF MAGNETIZABLE PARTICLES FROM A FINE GRANULAR SOLID

Hanns Decker, Cologne-Rath; Roland Pfeiffer, Bensberg-Frankenforst; Lothar Wenz, Cologne, and Horst Cordes, Troisdorf-Eschmar, all of Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Germany

Continuation of Ser. No. 461,723, April 17, 1974, abandoned.
This application Jan. 5, 1976, Ser. No. 646,585
Claims priority, application Germany, Apr. 27, 1973, 2321281
Int. Cl.[2] B03C 1/14
U.S. Cl. 209—223 R **1 Claim**



1. Apparatus for separating magnetizable particles from a flowing stream of material, comprising:

a channel including a plurality of vertical walls for directing the stream of material along a predetermined path, one wall of said plurality of walls including a vertically travelling conveyor belt, said channel including an inlet for receiving a stream of carrier medium;

means for introducing a carrier medium into said inlet of said channel;

at least one magnet system outside said channel adjacent said one wall creating a magnetic field within said channel in a portion of the path having a field strength of at least 15,000 Gauss and a magnetic gradient directed across the path to define a separating zone;

injecting means for injecting a charging material, including magnetizable particles to be separated therefrom, into the stream of carrier medium at a point within said channel oppositely spaced from said one wall and downstream of said inlet, the magnetizable particles being drawn toward said one wall by the force of said magnetic field;

means for removing at least a part of the carrier medium, together with non-drawn material, downstream of the sparating zone and spaced from said one wall; and

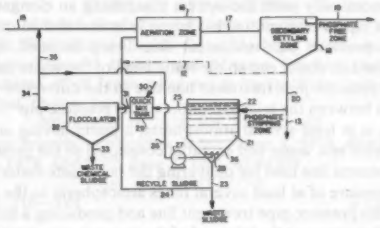
means for removing from said one wall those particles which adhere to said one wall including a member for doctoring particles from said conveyor belt.

4,042,493

PHOSPHATE REMOVAL FROM BOD-CONTAINING WASTEWATER

Ladislas Charles Matsch, Amherst, and Raymond Francis Drnevich, Clarence, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Oct. 28, 1975, Ser. No. 626,459
Int. Cl.[2] C02C 1/17
U.S. Cl. 210—6 **12 Claims**



1. In an activated sludge wastewater treatment process for removing phosphate from BOD-containing wastewater which comprises: mixing phosphate-containing influent wastewater with activated sludge and oxygen-containing gas in an aeration zone and simultaneously circulating one fluid against the other fluid for sufficient duration to reduce the BOD content of said wastewater and cause the microorganisms present in said activated sludge to take up phosphate to form an aerated mixed liquor containing phosphate-enriched sludge; separating said phosphate-enriched sludge from said aerated mixed liquor to provide a substantially phosphate-free effluent; passing said phosphate-enriched sludge to a phosphate stripping zone and maintaining at least a major portion of the sludge therein under anaerobic conditions to release phosphate from the phosphate-enriched sludge and form a phosphate-lower sludge and phosphate-enriched liquid; and withdrawing said phosphate-enriched liquid from an upper section of said stripping zone and said phosphate-lower sludge from a lower section of said stripping zone, recycling at least part of said phosphate-lower sludge to said aeration zone as said activated sludge; the improvement of countercurrently stripping released phosphate from the sludge in said stripping zone by the steps of: maintaining a sludge residence time in said stripping zone of from 2 to 10 hours; introducing a low phosphate, low solids aqueous stripping medium into said stripping zone lower section for upflow through at least part of the settling solids to said stripping zone upper section, whereby the phosphate released from the descending settling sludge solids is transferred to the countercurrently upflowing liquid to provide said phosphate-enriched liquid in said stripping zone upper section, said stripping medium having a suspended solids concentration of less than 200 mg./liter; and maintaining the volumetric flow rate of

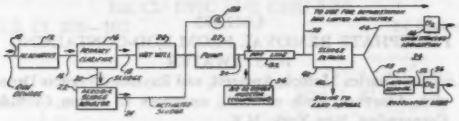
said stripping medium introduced into said stripping zone between 0.7 and 2.0 times the volumetric flow rate of said phosphate-enriched liquid withdrawn therefrom.

4,042,494

PRESSURE PIPE TREATMENT FOR SEWAGE

Ray L. Stoyer, Irvine, Calif., assignor to Irvine Ranch Water District, Irvine, Calif.

Continuation-in-part of Ser. No. 151,096, June 8, 1971, abandoned. This application Dec. 3, 1973, Ser. No. 421,421
Int. Cl.[2] C02C *1/08*
U.S. Cl. 210—7 **17 Claims**



1. A system for simultaneously treating and transporting raw liquid waste material from a point of collection to a location where treated effluent from the raw waste material can be economically used, the system comprising an elongated pressure pipe treatment line having an inlet end and an outlet end, the pressure pipe treatment line being inclined upwardly toward its outlet end so the static head of the waste material in the pressure pipe treatment line due to the difference in elevation between the inlet and outlet of the pressure pipe treatment line is at least several atmospheres; a pump having an inlet to receive raw waste and an outlet connected to the pressure pipe treatment line inlet for delivering the raw waste material under a pressure of at least several times atmospheric to the inlet end of the pressure pipe treatment line and producing a sufficiently high pressure at the inlet end of the pressure pipe treatment line to force the raw waste material toward the outlet end of the pressure pipe treatment line; means for injecting oxygen under a pressure of at least several atmospheres into the raw waste material at the high pressure end of the pressure pipe treatment line so the oxygen substantially reduces the biological oxygen demand of the raw waste material; and means at the outlet end of the pressure pipe treatment line for withdrawing the treated waste material.

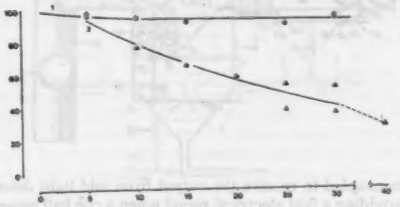
7. A method of delivering raw waste material from a downwardly extending trunk sewer pipe to a sewage treatment plant at the lower end of an upwardly inclined elongated pressure pipe treatment line for treatment of the raw waste material, the raw waste material including waste water and raw sewage solids, the method comprising the steps of removing a portion of the waste water from the raw waste material at a point upstream of the lower end of the trunk sewer pipe; delivering the remaining waste water and the raw sewage solids via the trunk sewer to the headworks; converting at least a portion of the raw sewage solids to activated sludge; delivering the activated sludge and the remaining waste water to the lower end of the pressure pipe treatment line at a sufficiently high pressure to force the activated sludge and waste water up the pressure pipe treatment line; injecting the removed portion of the waste water into the activated sludge and waste water flowing up the pressure pipe treatment line at a point spaced from the lower end of the pressure pipe treatment line; injecting a sufficient amount of oxygen under pressure into the activated sludge and waste water in the pressure pipe treatment line such that the oxygen substantially reduces the biological oxygen demand of the waste material in the pressure pipe treatment line; and withdrawing the treated waste material from the upper end of the pressure pipe treatment line.

4,042,495

METHOD FOR CONDITIONING FRESH AND SEA WATERS FROM OIL

Walter Marconi, San Donato Milanese; Nicola Oddo, and Ludwig Degen, both of Rome, all of Italy, assignors to Snam Progetti S.p.A., Milan, Italy

Continuation of Ser. No. 460,224, April 11, 1974, abandoned. This application Nov. 10, 1975, Ser. No. 630,670
Claims priority, application Italy, Apr. 13, 1973, 22951/73
Int. Cl.[2] C02B *9/02*
U.S. Cl. 210—11 **3 Claims**



1. The method of removing oily hydrocarbons from the surface of water which is polluted thereby and which contains aqueous microorganisms capable of metabolizing said oily hydrocarbons, which comprises dispersing over said polluted surface particles comprised of one or more solid nutrient salts selected from the group consisting of ammonium salts, ammonium nitrates, urea, sodium phosphates, potassium phosphates, ammonium phosphates, superphosphate, magnesium ammonium phosphate, and mixtures thereof, said particles having a surface coating of paraffin sufficient to cause the salts to be slowly soluble and to render the particles buoyant in water and lipophilic.

4,042,496

PROCESS FOR PREPARING IMPROVED CATION-EXCHANGE MEMBRANES

Sakae Tsushima; Teruyuki Misumi, both of Yokohama, and Masahiko Murakoshi, Tokyo, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed May 28, 1975, Ser. No. 581,491
Claims priority, application Japan, May 29, 1974, 49-59779
Int. Cl.[2] B01D *13/00*
U.S. Cl. 210—23 R **8 Claims**

1. A process for improving a cation-exchange membrane in specific permselectivity for monovalent ions which comprises contacting the cation-exchange membrane with a suspension, in water or in an aqueous solution of a salt containing said monovalent ions, of particles of a crosslinked high molecular weight substance having an anion-exchange group.

4,042,497

SEPTIC SYSTEM WITH LEVEL CONTROL

Frederick L. Maltby, 780 Glen Road, Jenkintown, Pa. 19046

Filed Dec. 11, 1975, Ser. No. 639,797
Int. Cl.[2] C02C *1/00*
U.S. Cl. 210—25 **19 Claims**

1. A waste disposal system comprising:
means for treating waste and storing liquid thereof;
drain means for draining the liquid into the adjacent soil;

transfer means for transferring the liquid from said means for treating and storing to said drain means; and

sensor means for sensing the liquid saturation of said soil;

said transfer means being coupled to said sensor means and being activated in response thereto to transfer said liquid waste material to said drain means when the liquid saturation is below a predetermined threshold.

4,042,498
SEPARATION OF ORGANIC COMPOUNDS BY ADSORPTION PROCESSES

David C. Kennedy, St. Louis, Mo., assignor to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 365,006, May 29, 1973, abandoned, which is a continuation-in-part of Ser. No. 172,795, Aug. 18, 1971, abandoned. This application Aug. 18, 1975, Ser. No. 605,780

Int. Cl.² C02B *1/14*

U.S. Cl. 210—26 **12 Claims**

1. A method of ecological improvement, which involves separating a relatively insoluble non-ionogenic, hydrophobic chlorinated pesticidal organic compound from an aqueous medium containing the same at extremely low levels, which comprises:

a. passing the medium through a bed of particles of an essentially non-ionogenic, macroreticular, water-insoluble crosslinked polymer of polymerizable ethylenically unsaturated monomers comprising about 2 to 100 weight percent of at least one poly(vinyl)benzene monomer selected from the group consisting of divinylbenzene, trivinylbenzene, alkyldivinylbenzenes having from 1 to 4 alkyl groups of 1 to 2 carbon atoms substituted in the benzene nucleus, and alkyl trivinylbenzenes having from 1 to 3 alkyl groups of 1 to 2 carbon atoms substituted in the benzene nucleus, which polymer has a porosity of at least 30% ranging up to 70% by volume, a surface area of 800 ± 20% square meters per gram, and pores of an average diameter of at least 20 A ranging up to 200 A; and

b. flowing a volatile organic solvent, selected from the group consisting of volatile ketones of 3 to 10 carbons, linear and branced alkanols having 1 to 10 carbons, alkyl esters of aliphatic acids from 1 to 10 carbons, aromatics to 10 carbons, and mono- and poly-halogenated alkanes up to 3 carbon atoms, through the loaded polymer bed to release substantially all of the adsorbed compound.

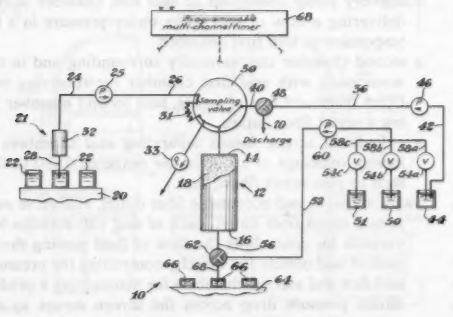
4,042,499
LIQUID ADSORPTION CHROMATOGRAPHIC APPARATUS AND METHOD

Tore Ramstad; Nels H. Mahle, and Ralph Matalon, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 2, 1976, Ser. No. 710,986

Int. Cl.² H01D *15/08*

U.S. Cl. 210—31 C **19 Claims**



1. In a liquid adsorption chromatographic process for the separation of a first solute from at least one second solute of differing polarity said solutes being commingled in a sample solution, by the preferential adsorption of the first solute on a chromatographic column with a solid particulate stationary phase consisting essentially of a charge of porous adsorbent material selected from the group consisting of silica gel, alumina and magnesium silicates, the improvement comprising sequentially:

a. passing a first eluant through the stationary phase at a rate sufficient to selectively elute the second solute from the stationary phase;

b. passing a second eluant through the stationary phase in a direction countercurrent to the direction of the first eluant to selectively elute the first adsorbed solute from the stationary phase;

c. passing a stripping fluid through the stationary phase in a direction cocurrent to the direction of the second eluant to remove second eluant retained on the stationary phase; and

d. passing additional first eluant through the stationary phase in a direction cocurrent to the direction of the stripping fluid to re-equilibrate the stationary phase for introduction of a subsequent sample solution into the column.

4,042,500
FLUIDIZED-BED TYPE MULTISTAGE SOLID-LIQUID CONTACT APPARATUS

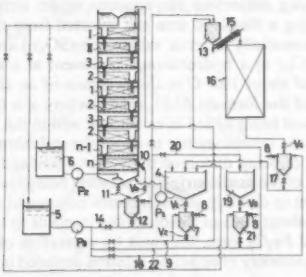
Yasunao Misaka; Ikuo Tanaka, both of Yokohama; Hirro Okada, Sagamihara; Chuichi Goto; Moriyuki Hirota, both of Yamato; Masaaki Uesugi, and Mitsuru Tsuchiya, both of Yokohama, all of Japan, assignors to Kurita Water Industries Limited, Osaka, Japan

Filed May 28, 1975, Ser. No. 581,657

Claims priority, application Japan, June 3, 1974, 49-61796; June 3, 1974, 49-61797; June 3, 1974, 49-61799

Int. Cl.² B01D *33/30*

U.S. Cl. 210—189 **6 Claims**



1. An improved fluidized-bed type multistage solid-liquid contact apparatus, comprising in combination:

a contact column consisting of a vertical column, support plates disposed horizontally in a plurality of stages within said column, possessed of a multiplicity of perforations and, with the exception of the particular support plate in the lowermost stage, each having a downcomer adapted to permit communication between the upper side and the lower side of the support plate, and solid particles piled up on each of said support plates,

a crude liquid storage tank for accommodating a crude liquid to be supplied to said contact column,

means for delivering said crude liquid from said crude liquid storage tank to the space below the lowermost support plate within said contact column,

a treated liquid tank for accommodating the liquid to be discharged from said contact column.

means for forwarding the treated liquid from the space

above the uppermost support plate within said contact column to the treated liquid tank, and

solid particles supply means for delivering solid particles onto the support plate on the uppermost stage in said contact column and solid particles withdrawal means for withdrawing solid particles out of the lower portion of said contact column,

said solid particles supply means incorporating therein a solid particles storage tank which is provided with a metering tank for metering solid particles for delivery to said contact column,

said support plates are each made up of a plurality of component plates spaced by a fixed distance, said component plates containing perforations of a diameter greater than that of the solid particles piled up thereon, said perforations in the upper component plates and those in the lower component plate being in staggered relationship,

said perforations bored in each support plate each having a diameter not exceeding 20 percent of the inside diameter of said contact column but falling in the range of from 10 to 150 mm,

the upper half portion of said downcomers each having a greater inside cross-sectional area than that of the lower half portion, and

said downcomer of each support plate has its lower aperture at a level lower than the upper aperture of the downcomer of the next lower support plate.

4,042,501

PURIFICATION OF IRON CONTAINING ACIDIC SOLUTIONS

William R. King, San Carlos, Calif., assignor to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Filed July 2, 1976, Ser. No. 702,301
Int. Cl.[2] C02C *5/02*
U.S. Cl. 210—51 **5 Claims**

1. A process for removing dissolved iron salts from aqueous, acidic stripping solutions which result from the stripping of organic, iron-laden extractants with an aqueous acid solution comprising subjecting the aqueous acidic stripping solution containing a dissolved iron salt selected from the group consisting essentially of ferric sulfate ($Fe_2(SO_4)_3$) and ferric chloride ($FeCl_3$) to a hydrothermal treatment at a temperature in excess of about 100° C in the presence of an aluminous compound of the formula $Al_2O_3.xH_2O$, where x is 0.01 to 3.0, the compound being added in an amount within the range of about 20% of the stoichiometric to about the stoichiometric quantity capable of being dissolved by the total free and liberated acid content of the acidic stripping solution being treated for a time sufficient to dissolve said aluminous compound and to convert at least about 50% of the dissolved iron salt to the acid insoluble solid Fe_2O_3 form, followed by separation of the solid Fe_2O_3 and recovery of an acidic solution depleted in dissolved iron content.

4,042,502

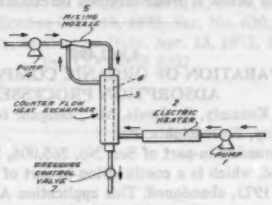
DETOXIFICATION OF CYANIDES AND CYANIDE-CONTAINING SOLUTIONS

Joachim Schmidt; Wolfgang Bamberg; Hartmut Grunert; Erhard Schorm, and Christian Weigelt, all of Jena, Germany, assignors to VEB Jenapharm Jena

Division of Ser. No. 443,013, Feb. 15, 1974, abandoned. This application Mar. 21, 1975, Ser. No. 560,989
Claims priority, application Germany, May 10, 1973, 170844
Int. Cl.[2] C02C *5/02*
U.S. Cl. 210—59 **11 Claims**

1. A continuous process of detoxifying aqueous cyanide solutions comprising the steps of,

starting the process cycle by heating a counterflow heat exchanger, then, in successive steps, passing the cyanide solution through a first flow path of said heat exchanger in order to preheat the solution, then, after passing the solution out of the heat exchanger, raising its temperature to a peak of about 200° to 250° C so as to effect a detoxifying hydrolysis of the solution, the solution being heated in said preheating step to more than half of the temperature reached as said peak temperature, and thereafter passing the detoxified solution through a second flow path of the



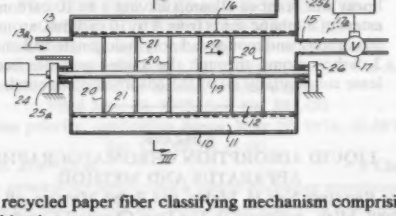
heat exchanger in heat exchange contact with fresh cyanide solution passed into said first flow path of the heat exchanger in order to effect said preheating of the solution, and maintaining a pressure of about 40 to 140 atm. during the hydrolysis reaction and in said second flow path of the heat exchanger.

4,042,503

CLASSIFIER AND PROCESS FOR RECYCLED FIBER SEPARATION

Edgar J. Justus, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.

Continuation of Ser. No. 423,277, Dec. 10, 1973, abandoned. This application Feb. 19, 1975, Ser. No. 551,066
Int. Cl.[2] B01D *33/38*
U.S. Cl. 210—65 **8 Claims**



1. A recycled paper fiber classifying mechanism comprising, in combination:

a first cylindrical chamber having an inlet for receiving a mixture of acceptable fibers and reject fibers carried in a fluid suspension to be classified, said first chamber having an acceptable fiber outlet;

a delivery pump connected to said first chamber inlet for delivering a flow of said fibers under pressure in a fluid suspension to said first chamber;

a second chamber concentrically surrounding and in communication with said first chamber for receiving reject fibers from said first chamber, said second chamber having a reject fiber outlet;

a cylindrical screen means separating said chambers and having openings of a size in the range of 0.010 to 0.090 inch to pass reject fibers; and

valve means in said acceptable fiber outlet, and valve means in said reject fiber outlet, each of said valve means being variable for controlling the flow of fluid passing through each of said outlets and thereby controlling the pressure in said first and second chambers for maintaining a predetermined pressure drop across the screen means so as to control the apportionment of fluid through the screen means and through the acceptable fiber outlet and the

reject fiber outlet and thereby control the classification of fibers.

4,042,504

SELF CLEANABLE FILTERS

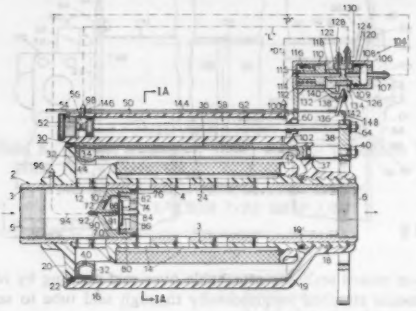
Mordeki Drori, 89 Zahal Street, Kiron, Israel

Filed Sept. 29, 1976, Ser. No. 727,860

Claims priority, application Israel, May 23, 1976, 49635; June 23, 1976, 49875; Aug. 20, 1976, 50317

Int. Cl.[2] B01D *29/38*

U.S. Cl. 210—107 **32 Claims**



1. A self-cleanable filter, comprising: a housing having a fluid inlet, a fluid outlet, and a dirt purging opening; a filter body within the housing and having a surface facing the inlet side of the housing; and a cleaning body within the housing and movable from a home position along said cylindrical surface of the filter body for cleaning same; said cleaning body comprising a first section defining an internal chamber having an inlet opening facing the surface of the filter body to be cleaned and movable along said surface for cleaning same; and a second section closing the dirt purging opening when the cleaning body is in its home position, said second section having an outlet opening communicating with said internal chamber and located within said housing in the home position of the cleaning body but movable through the housing purging opening to a position externally of the housing upon the movement of the cleaning body for cleaning the filter.

4,042,505

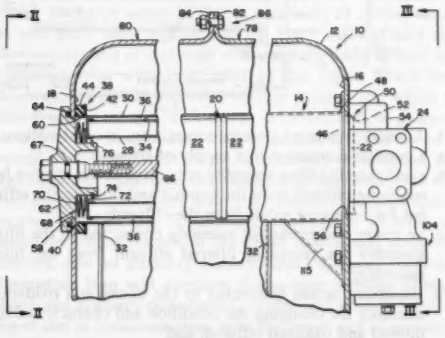
FILTER ARRANGEMENT WITH BAFFLES

John B. Waggoner, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 30, 1976, Ser. No. 719,005

Int. Cl.[2] B01D *27/10*; E03B *11/00*

U.S. Cl. 210—132 **5 Claims**



1. In a hydraulic reservoir which comprises a tank having internally thereof filter means attached longitudinally between a first and a second generally parallel side thereof, said filter means including generally tubular filter element means extending generally longitudinally between said first and second sides of said tank and means for introducing a hydraulic fluid from an exterior of said tank to an interior of said element means from adjacent said first side of said tank, an improvement comprising:

a tube within said tank in an upper portion thereof surrounding said element means and extending longitudinally generally the length thereof, said tube including exit means therethrough through which said hydraulic fluid passes into said reservoir after passage thereof from the interior to an exterior of said element means, a first end of said tube sealing adjacent said second side of said tank and a second end of said tube sealing adjacent said first side of said tank; and

first conduit means with a first open end surrounding said exit means and in fluid communication therewith, and a second end located in a lower portion of said reservoir, said second end having egress means therefrom to said reservoir lower portion.

4,042,506

APPARATUS FOR REMOVING SOLID MATERIAL FROM SEWAGE OR OTHER LIQUID

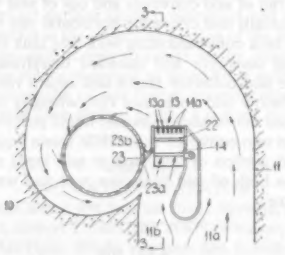
Reginald Albert Edward Wilson, Stourbridge, England, assignor to Jones & Attwood Limited, Stourbridge, England

Filed Apr. 9, 1976, Ser. No. 675,455

Claims priority, application United Kingdom, Apr. 24, 1975, 16979/75

Int. Cl.[2] B01D *33/06*

U.S. Cl. 210—155 **7 Claims**

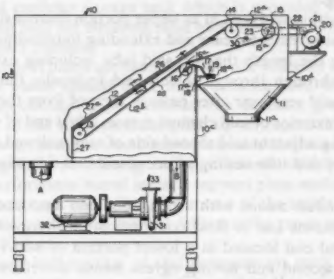


1. Apparatus for removing solid material from a flow of sewage or other liquid, said apparatus comprising a duct through which sewage is to flow, a first screen located in said duct and adapted to filter solid material from the sewage flowing through the duct, said first screen being of generally cylindrical form with its axis extending in a vertical direction and being rotatable about said axis, a second, vertically extending, screen located adjacent to said first screen and adapted to receive solid material filtered from the sewage flow by the first screen, a lifting plate reciprocable in a vertical or substantially vertical direction over said second screen, said lifting plate collecting solid material from said second screen and lifting it to a position which in use is above the upper surface of the flow of sewage, and a generally horizontally extending compression chamber having means for removing solid material from said lifting plate when the latter is in its upper position.

4,042,507
WASTE LIQUID RENOVATOR

Charles E. Langmack, Cleveland, Ohio, assignor to Niagara Bottle Washer Mfg. Company, Cleveland, Ohio

Filed Aug. 19, 1976, Ser. No. 715,858
Int. Cl.[2] B01D *33/04*
U.S. Cl. 210—158 5 Claims



1. In a waste liquid renovator, a tank having an input side and an output side, means for introducing waste liquid containing floating refuse at said input side into a waste liquid portion of said tank, a movable filtering conveyor of wire mesh having cross-wise roller supports guiding said conveyor in an upward inclined run moving from a zone nearer the bottom of said tank on the input side to a zone nearer the top of said tank on the output side, said conveyor having a generally horizontal run downstream from said upper zone, said conveyor then having a return run inclined downwardly to said lower zone and there transversing a bottom support roller, means for driving said conveyor, an impervious baffle extending entirely across said tank and extending between said waste liquid portion and a renovated liquid portion of said tank, said baffle extending from the bottom of said tank to a zone above said bottom support roller and on the waste liquid side of said last named roller, said baffle being bent over closely on top of said upward inclined run for a short distance, means for pumping renovated liquid from said renovated liquid portion of said tank beneath said return run of said conveyor and out of said tank, a refuse collector beneath said conveyor horizontal run on the output side of said tank communicating with said tank only from just beneath said conveyor and outward therefrom, a cleaning spray above said collector above said return run of said conveyor and below said horizontal run, whereby renovated liquid is pumped out of said renovated liquid portion of said tank beneath said two conveyor runs while waste liquid enters said waste liquid portion of said tank at said input side, refuse is collected on both of said conveyor runs and washed off into said collector.

4,042,508
FILTER HOLDING MEANS

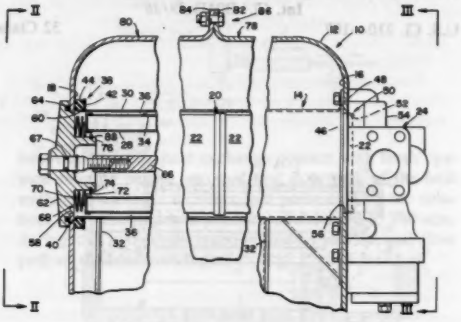
Eugene E. Latimer, Wilmington, and John B. Waggoner, Joliet, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 30, 1976, Ser. No. 719,004
Int. Cl.[2] E03B *11/00*
U.S. Cl. 210—172 5 Claims

1. In a hydraulic reservoir which comprises a tank having internally thereof filter means attached longitudinally between a first and a second generally parallel side thereof, said filter means including generally tubular filter element means extending generally longitudinally between said first and second side of said tank and means for introducing a hydraulic fluid from an exterior of said tank to an interior of said element means from adjacent said first side of said tank, an improvement comprising:

a tube within said tank surrounding said element means and extending longitudinally generally the length thereof, said tube including exit means therethrough through which said hydraulic fluid passes into said reservoir after passage thereof from the interior to an exterior of said element means, a first end of said tube sealing adjacent said second side of said tank and a second end of said tube sealing adjacent said first side of said tank;

an opening through said second side of said tank to an interior of said tube adjacent said first end thereof, said opening being sized to allow entry of said element means to the interior of said tube;



cover means sealingly attachable over said opening by rod means attached longitudinally through said tube to said first side of said tank;

a collar generally coaxially surrounding said rod means and extending from said cover means towards said first side of said tank within said tube;

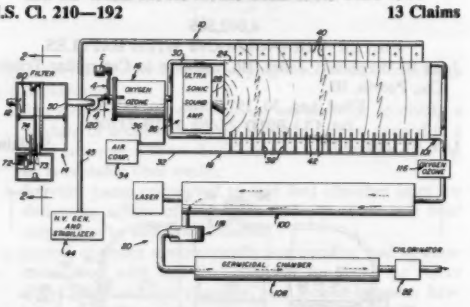
compressible spring means surrounding said collar and compressing said element means towards said first side of said tank; and

retaining means for holding said spring means on said collar.

4,042,509
WATER TREATMENT SYSTEM

James H. Bowen, Adger, Ala., assignor to BDH, Inc.(Entire), Rome, Ga.

Substitute application for Ser. No. 539,908, Jan. 9, 1975, abandoned.
Filed Mar. 11, 1976, Ser. No. 665,870
Int. Cl.[2] B01D *33/02, 35/22;* C02B *1/80;* C02C *5/04*
U.S. Cl. 210—192 13 Claims



1. A water treatment system, comprising, in combination:

a. a conduit connected to a supply of effluent;

b. a self-cleaning filter assembly connected to the conduit for receiving effluent from the conduit and filtering the effluent for removing solids from the effluent;

c. an ozone and oxidation assembly connected to the filter assembly for receiving filtered effluent from the filter assembly;

d. ozonizing means connected to the ozone and oxidation assembly for changing the condition and character of the filtered and oxidized effluent; and

e. sterilizing means connected to the ozonizing means for

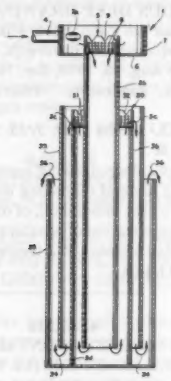
decontaminating the filtered, oxidized, and ozonized effluent; and the ozonizing means includes; a casing connected to the ozone and oxidation assembly for receiving effluent from the ozone and oxidation assembly; an ultra-sonic sound generating system including a speaker arranged in the casing for breaking down particles in the effluent by subjecting the effluent to ultra-sonic waves; an air line connected to the casing and arranged for injecting air into the casing and aerating the effluent passing through the casing; and electrodes connected to a source of electrical energy and to the casing for passing an electrical current through the effluent in the casing and creating ozone in the presence of the air and effluent in the casing.

4,042,510

LIQUID AERATION DEVICE

John K. Sullins, Kingsport, Tenn., assignor to Canton Textile Mills, Inc., Canton, Ga.

Filed Sept. 2, 1976, Ser. No. 719,996
Int. Cl.² C02B *1/34*; B01F *3/04*
U.S. Cl. 210—220 **8 Claims**



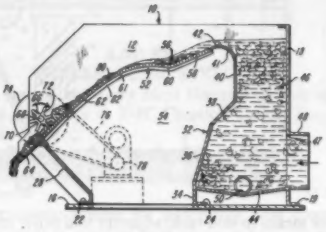
1. A liquid aeration device comprising a receiver chamber for receiving liquid to be aerated and having a vertically disposed aerator wall, aerator orifices formed in said aerator wall, a main vertically disposed downcomer conduit with its upper end arranged to receive liquid from said aerator orifices via free fall from said aerator orifices through atmospheric air, a main riser conduit of larger transverse dimensions than said main downcomer conduit and disposed about said main downcomer conduit, the upper end of said main riser conduit constituting discharge means including a plurality of orifices formed in said main riser conduit and the lower ends of said main downcomer and of said main riser conduits being in fluid tight communication with each other so that liquid which flows downwardly in said main downcomer conduit and which has dissolved and entrapped air therein is caused to flow upwardly in said main riser conduit without escape of liquid or of air except at said discharge means, an auxiliary downcomer conduit of larger transverse dimensions than said main riser conduit disposed about said main riser conduit and arranged to receive liquid by free fall through atmospheric air from said discharge means formed in the upper end of said main riser conduit, and an auxiliary riser conduit of larger transverse dimensions than said auxiliary downcomer conduit disposed about said auxiliary downcomer conduit and arranged with its lower end in communication with the lower end of said auxiliary downcomer conduit.

4,042,511

LOW PROFILE STATIC SCREEN

Marvin E. Ginaven, Springfield, Ohio, assignor to The Bauer Bros. Co., Springfield, Ohio

Continuation of Ser. No. 404,765, Oct. 9, 1973, abandoned. This application Sept. 26, 1975, Ser. No. 617,186
Int. Cl.² B07B *1/04*
U.S. Cl. 210—386 **18 Claims**



1. Apparatus for separating and classifying the contents of a flowing slurry including a descending flow surface defined, at least in part, by static screen structure sections of which form longitudinally extending parts of said flow surface, said screen sections being formed to influence liquid to separate from a slurry in the course of its movement across said flow surface, an upper of said sections providing a part of said flow surface which is downwardly inclined to form an angle not substantially greater than 35° with an intersecting horizontal plane, a further of said screen sections providing another part of said flow surface having an arcuately formed generally convex profile, and another of said screen sections being located between said upper and said further screen sections to provide an additional part of said flow surface which has a generally horizontal orientation and provides an impact surface interposed in the path of a slurry flowing down said upper part of said flow surface at a position to create therein reactant forces which influence a substantial separation of liquid from the flow, said impact surface being constructed and arranged for influencing solids in the impacting portion of the slurry flow to lift away from said screen structure as the remaining liquid content of the slurry is caused to move from said impact surface and downwardly of said further screen section providing said part of said flow surface having a convex profile.

4,042,512

OIL WATER SEPARATOR

Patrick M. McCarthy, 486 Sayville Blvd., Sayville, Long Island, N.Y. 11782; Gilbert T. McTighe, 804 N. Windsor, Apt. 10, and Robert T. McTighe, 804 N. Windsor, Apt. 6, both of Mitchell, S. Dak. 57301

Filed Oct. 27, 1976, Ser. No. 736,247
Int. Cl.² B03D *3/00*
U.S. Cl. 210—519 **6 Claims**

1. An oil-water separator comprising:

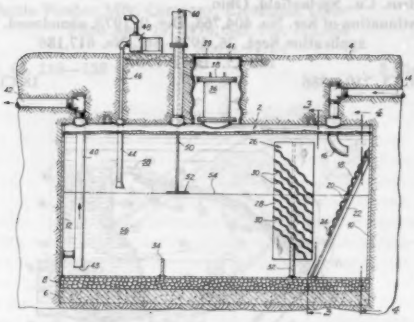
a tank;

an oil-water mixture inlet at one end of said tank adjacent the top thereof;

a baffle member in said one end of said tank, sloping downwardly and inwardly from adjacent the top thereof toward the bottom of said tank adjacent said one end and having an upper surface defining transverse corrugations, said inlet being arranged to direct the incoming oil-water mixture onto the upper portion of said surface;

a plurality of parallel, transversely corrugated and spaced baffle plates in said tank sloping upwardly and away from said one end from a region adjacent but spaced from the lowermost portion of said baffle member;

outlet means at the other end of said tank adjacent the bottom thereof for withdrawing clarified water therefrom; and



further means in said tank, adjacent said other end, for withdrawing separated oil from the upper portion of said tank.

4,042,513

CONCENTRATES OF N-SUBSTITUTED MORPHOLINES

Norman Anthony Meinhardt, Lyndhurst, and Robert Widmer, Painesville, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

Continuation-in-part of Ser. No. 480,767, June 19, 1974, and Ser. No. 562,732, March 27, 1975, abandoned. This application July 24, 1975, Ser. No. 598,961

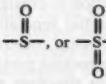
Int. Cl.² C10M *1/38*

U.S. Cl. 252—47.5 **7 Claims**

1. An additive concentrate comprising an inert solvent/diluent containing about 20% to about 90% of at least one N-substituted morpholine of the formula

$$O(CH_2CH_2)_2NR'YR''$$

wherein R' is a hydrocarbyl or hydrocarbyl interrupted with *Y* group of at least one to about thirty carbon atoms, Y is —O—,



R'' being a hydrocarbyl radical of at least 15 carbon atoms.

4,042,514

NOVEL LUBRICATING COMPOSITIONS CONTAINING DERIVATIVES OF 1,2-DITHIOL-3-THIONES OR 1,2-DITHIOL-3-ONES

Francois Giolito, Lyon, and Georges Rivier, Bron, both of France, assignors to Orogil, Paris, France

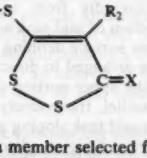
Filed Feb. 5, 1976, Ser. No. 655,482

Claims priority, application France, Feb. 17, 1975, 75.04796

Int. Cl.² C10M *1/38*

U.S. Cl. 252—48.6 **5 Claims**

1. A novel lubricating composition comprising a major proportion of at least one lubricating oil and between about 0.2 and 10% by weight of at least one additive which is a derivative of a 1,2-dithiol-3-thione or a 1,2-dithiol-3-one, characterized in that the said derivative has the formula:



in which formula R_1 is a member selected from the class consisting of alkyl and alkylaromatic hydrocarbon radicals, R_2 is a member selected from the class consisting of a hydrogen atom, alkyl radicals, a halogen atom, or a carboxyalkyl radical COOR in which R is an alkyl radical containing from about 1 to 12 carbon atoms, R_1 and R_2 together having a total of from about 3 to 24 carbon atoms when R_2 is a hydrogen atom, an alkyl or carboxyalkyl radical, and R_1 having from about 2 to 22 carbon atoms when R_2 is a halogen atom, and X is a sulphur or oxygen atom, but when an oxygen atom, R_2 is a halogen atom.

3. A novel lubricating composition according to claim 1, characterized in that the derivative of the 1,2-dithiol-3-thiones or 1,2-dithiol-3-ones is a member selected from the class consisting of: 5-n-butylthio-4-methyl-1,2-dithiol-3-thione, 5-heptylthio-4-methyl-1,2-dithiol-3-thione, 5-dodecylthio-4-methyl-1,2-dithiol-3-thione, 5-dodecylbenzylthio-4-neopentyl-1,2-dithiol-3-thione, 5-n-pentylthio-4-H-1,2-dithiole-3 -thione, 5-para-dodecylbenzylthio-4-H-1,2-dithiol-3-thione, 5-t-butylthio-4-chloro-1,2-dithiol-3-thione, 5-dodecylthio-4-chloro-1, 2-dithiol-3-thione, =-p-methylbenzylthio-4-chloro-1,2-dithio-3-thione, 5-n-hexylthio-4-carbonhyxoxy-1,2-dithio-3-thione, 5-hexylbenzylthio-4-carbohexoxy-1,2-dithiol-3-thione, 5-t-butylthio-4-chloro-1,2-dithiol-3-one, 5-isopropylthio-4-chloro-1,2-dithiol-3-one and 5-hexylbenzylthio-4-chloro-1,2-dithio-3-one.

4,042,515

ANHYDROUS DEEP-DRAWING LUBRICANT

Fredericus Bastiaan van Zalm, Beverwijk, Netherlands, assignor to B. V. Beverolfabrieken, Beverwijk, Netherlands

Filed Aug. 15, 1975, Ser. No. 605,014

Claims priority, application Netherlands, Aug. 16, 1974, 7411032

Int. Cl.² C10M *1/24, 3/18, 5/12, 7/26*

U.S. Cl. 252—56 R **5 Claims**

1. An anyhydrous deep-drawing agent consisting essentially of a deep-drawing mineral oil having dissolved therein 1–50% by weight, based on the mineral oil, of dimeric carboxylic acids prepared by oligomerization of unsaturated fatty acids of 16–26 carbon atoms under pressure at a temperature of 180°–360° C. for about 3 to 10 hours.

4,042,516

BONDED MAGNETS CONTAINING SINGLE CRYSTALLINE FERRITE PARTICLES

Seiji Matsumoto, and Kiyoshi Fukai, both of Sakai, Japan, assignors to Sakai Chemical Industry Co., Ltd., Sakai, Japan

Division of Ser. No. 472,740, May 23, 1974. This application Nov. 18, 1975, Ser. No. 633,085

Claims priority, application Japan, Mar. 1, 1977, 49-23938; Apr. 16, 1974, 49-42916

Int. Cl.² H01F *1/117;* C04B *35/26*

U.S. Cl. 252—62.54 **4 Claims**

1. In an anisotropic magnet comprising ferrite particles dispersed in a plastic or rubber binder, the improvement wherein:

said ferrite particles consist essentially of single-domain crystal strontium or barium ferrite particles having the stoichiometric composition $Mo.6Fe_2O_3$ wherein M is divalent strontium or barium, in the form of fine, well-defined, hexagonal plates about 0.5μ to 2.0μ in diameter and less than about one-fourth of said diameter in thickness, produced by:

a. reacting an admixture of

i. about 4.3 to 6.5 moles, expressed as ferric oxide, of an iron compound selected from the group consisting of ferric hydroxide, ferric oxyhydroxide, calcined porous ferric oxide and ferric oxide having a particle size less than about 0.8μ;

ii. about one mole, expressed as metal oxide, of at least one metal compound selected from the group consisting of the oxides, hydroxides, carbonates and carboxylates of strontium and barium; and

iii. about 0.05-2 moles of a metal chloride flux selected

from the group consisting of strontium chloride, barium chloride and mixtures thereof,

at a temperature between the melting point of said metal chloride flux and 1300° C. to form said strontium ferrite or barium ferrite particles;

b. cooling the resultant reaction mixture to form a cake comprising said single crystal ferrite particles and water soluble flux intervened therebetween; and

c. extracting said water soluble flux from said particles.

4,042,517

ELECTROSTATOGRAPHIC DEVELOPER MIXTURE CONTAINING A THERMOSET ACRYLIC RESIN COATED CARRIER

Joseph H. Moriconi, and Louis H. Burrows, Jr., both of Rochester, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 315,958, Dec. 18, 1972, Pat. No. 3,916,065.
This application Apr. 18, 1975, Ser. No. 569,341
Int. Cl.[2] G03G *9/08, 13/08*
U.S. Cl. 252—62.1 P **6 Claims**

1. An electrostatographic developer mixture comprising finely-divided toner particles electrostatically clinging to the surface of carrier particles having an average particle diameter of between about 50 microns and about 1,000 microns, said carrier particles consisting essentially of a metallic core coated with a thermoset crosslinked acrylic resin to form an adherent durable film of said resin on said core, said acrylic resin consisting essentially of esters of acrylic and methacrylic acids selected from the group consisting of a hydroxyl-functional resin crosslinked with nitrogen resins.

4,042,518

STOICHIOMETRIC FERRITE CARRIERS

Lewis O. Jones, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 394,604, Sept. 5, 1973, Pat. No. 3,929,657.
This application July 7, 1975, Ser. No. 593,401
Int. Cl.[2] G03G *9/00;* **C04B** *35/30*
U.S. Cl. 252—62.6 **1 Claim**

1. Humidity-insensitive magnetically attractable, semi-conductive, uncoated electrostatographic ferrite carrier material useful for development of electrostatic latent images, said carrier material having an average particle diameter of between about 50 microns and about 500 microns and consisting essentially of a sintered mixture of metal oxides of the formulation $NiO_{0.176}ZnO_{0.45}MgO_{0.3}MnO_{0.05}CuO_{0.06}(Fe_2O_3)_{1.0}$.

4,042,519

FERRIMAGNETIC GLASS-CERAMICS

Edward A. Weaver, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Feb. 16, 1973, Ser. No. 333,286
Int. Cl.[2] C04B *35/14, 35/30, 35/38*
U.S. Cl. 252—62.59 **13 Claims**

1. A homogeneous thermally crystallizable glass composition consisting essentially of:

COMPONENT	WEIGHT %
K_2O	2 - 20
SiO_2	30 - 60
Fe_2O_3	15 - 45
ZnO	0 - 20
MgO	0 - 10
MO	3 - 25
wherein MO is	
NiO	0 - 20
MnO	0 - 20

wherein Fe_2O_3, ZnO, NiO, MnO and MgO are present in the proportions defined by $ZnO_{1-x}MO_xFe_2O_3$, wherein x is a whole or fractional number ranging from 0.1 to 1 inclusively; or $MgO_{0.5}MnO_{0.5}Fe_2O_3$.

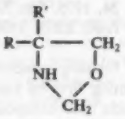
4,042,520

THERMOGENIC SYSTEM

John Adams Frump, and Jerry Hoyt Hunsucker, both of Terre Haute, Ind., assignors to IMC Chemical Group, Inc., Terre Haute, Ind.

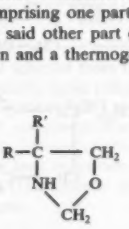
Filed Feb. 5, 1976, Ser. No. 655,321
Int. Cl.[2] C09K *3/00, 3/18, 5/00*
U.S. Cl. 252—70 **35 Claims**

1. A thermogenic system for generating heat comprising hydrogen peroxide in reaction with an oxazolidine thermogen having the general formula



wherein R and R′ may be the same or different and are selected from the group consisting of hydrogen, alkyl of from 1 to 4 carbon atoms, and hydroxymethyl in an effective amount sufficient to produce a sensible temperature rise.

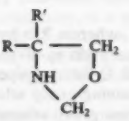
16. A two part thermogenic system arranged in a dispensing package with consumer-type compositions, the parts to be mixed at the time of dispensing from the package in relative amounts sufficient to effect a sensible temperature rise in the dispensed mixture; comprising one part consisting essentially of hydrogen peroxide; said other part consisting of the consumer-type composition and a thermogen having the general formula



wherein R and R′ may be the same or different and are selected from the group consisting of hydrogen, alkyl of from 1 to 4 carbon atoms, and hydroxymethyl.

23. A method of heating a material selected from shaving cream, cleansing cream, hand cleanser and windshield de-icer comprising the steps of

a. combining with the material to be heated an oxazolidine thermogen of the general formula



wherein R and R′ may be the same or different and are selected from the group consisting of hydrogen, alkyl of from 1 to 4 carbon atoms, and hydroxymethyl, and

b. mixing therewith hydrogen peroxide, in an amount sufficient to produce a sensible temperature rise in the mixture.

4,042,521

FIRE EXTINGUISHING COMPOSITION

Byron G. Dunn, 6831 Orchid Lane, Dallas, Tex. 75230

Continuation-in-part of Ser. No. 400,623, Sept. 25, 1973, Pat. No. 3,889,754, which is a continuation-in-part of Ser. No. 131,333, April 5, 1971, Pat. No. 3,733,111. This application Nov. 26, 1973, Ser. No. 400,640

Int. Cl.[2] A62D *1/00*

U.S. Cl. 252—5 **8 Claims**

1. A dry chemical fire-extinguishing composition, comprising; a fire extinguishing agent consisting essentially of about 50 to 95% by weight of a solid, particle-form metal carbonate, selected from the group consisting of alkali metal carbonates, alkali metal bicarbonates, alkaline earth metal carbonates, alkaline earth metal bicarbonates and mixtures thereof and about 50 to 5% by weight of a solid, particle-form synthetic metal silicate.

4,042,522

AQUEOUS WETTING AND FILM FORMING COMPOSITIONS

Robert A. Falk, New City, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

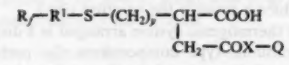
Filed Mar. 24, 1975, Ser. No. 561,393

Int. Cl.[2] A62D *1/00*; B27K *3/00*; B01F *17/30*

U.S. Cl. 252—8.05 **6 Claims**

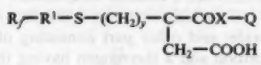
1. An aqueous film forming concentrate composition for extinguishing or preventing fires by suppressing the vaporization of flammable liquids, said composition consisting essentially of

A. 0.5 to 25% by weight of an amphoteric fluorinated surfactant represented by the formulae



I

and its isomer



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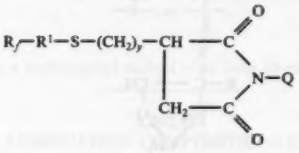


III

wherein

R_f is straight or branched chain perfluoroalkyl of 1 to 18 carbon atoms or said perfluoroalkyl substituted by perfluoroalkoxy of 2 to 6 carbon atoms,

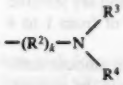
R^1 is branched or straight chain alkylene of 1 to 12 carbon atoms, alkylenethioalkylene of 2 to 12 carbon atoms, alkyleneoxyalkylene of 2 to 12 carbon atoms or alkyleneiminoalkylene of 2 to 12 carbon atoms wherein the nitrogen atom contains as a third substituent, hydrogen or alkyl of 1 to 6 carbon atoms,

y is 1 zero,

X is oxygen or –NR, wherein R is hydrogen, lower alkyl of 1 to 6 carbon atoms, hydroxy-alkyl of 1 to 6 carbon atoms, or R together with Q forms a piperazine ring, and

Q is a nitrogen containing group selected from

1. an aliphatic amino group selected from



(1a)

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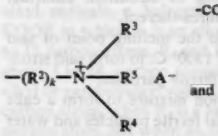
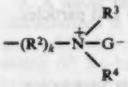


(1b)

and



(1c)

wherein

R^2 is a linear or branched alkylene of 2 to 12 carbon atoms, oxygen or sulfur interrupted linear or branched alkylene of up to 60 carbon atoms, or hydroxyl substituted alkylene. Preferably R^2 is a straight chain or branched alkylene of 2 to 5 carbon atoms;

k is 1 or zero, with the provision that if X is oxygen, *k* is 1;

R^3 and R^4 are independently of each other hydrogen, alkyl group, substituted alkyl group of 1 to 20 carbon atoms; phenyl group, alkyl or halogen substituted phenyl group of 6 to 20 carbon atoms, polyethoxy or polypropoxy group of 2 to 20 alkoxy units with the proviso that if X is oxygen, R^3 and R^4 are not hydrogen. The alkyl substituents can be alkyl of 1 to 5 carbon atoms, dienyl, hydroxyl, carboxyl, halogen, alkylene dialkylphosphonate such as methylene-diethylphosphonate or a group

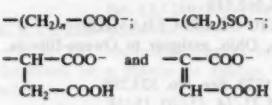
Phenyl substituents can be methyl, halogen or hydroxyl. Preferably R^3 and R^4 are alkyl groups of 1 to 4 carbons.

A^- is any anion which forms an ammonium salt of the formula $NH_4^+A^-$ having a solubility in water of at least about 1%.

Anion A^- is derived from alkyl halides, benzene or chlorobenzene sulfonate esters of alkyl alcohols and methyl and ethyl sulfates. A^- is preferably Cl^- or $CH_3CH_2OSO_3^-$.

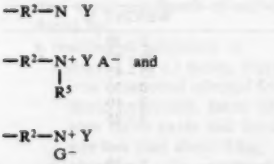
R^5 is hydrogen, an alkyl group or hydroxyalkyl group, aralkyl or groups of the formula $-(CH_2)_n-COO-$alkyl, said alkyl group having 1 to 18 carbons. Preferably, R^5 is methyl, ethyl, propyl, butyl or benzyl.

G^- is selected from the groups



where *n* is 1 to 5;

2. cyclic amino groups selected from



(2a)

(2b)

and

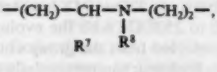
(2c)

wherein Y is a diradical group of the formulae:

$-(CH_2)_4-$

$-(CH_2)_5-$

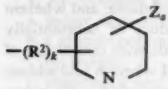
$-(CH_2)_2-O-(CH_2)_2-$



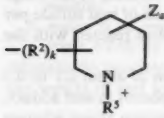
wherein R^2, R^5, A^- and G^- are as defined above,

R^7 and R^8 are independent hydrogen, a lower alkyl or hydroxy-lower alkyl group of 1 to 6 carbon atoms, with the provision, that if X is oxygen, R^8 cannot be hydrogen.

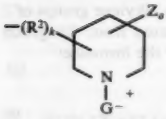
3. aromatic amino groups selected from



(3a)

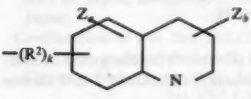


(3b)

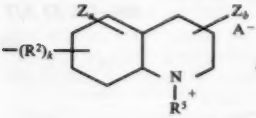


(3c)

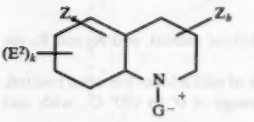
4. fused-ring aromatic amino group selected from



(4a)



(4b)



(4c)

wherein

Z is halogen or methyl,

$a + b$ is an integer from 0–3; and

5. a heterocyclic amino group of the formula

5a. $-(R^2)_k-E$

5b. $-(R^2)_k-E^+-R^5\,A^-$

5c. $-(R^2)_k-E^+-G^-$

where k is one or zero and

E is selected from N-hydroxyalkyl or N-amino-alkyl, substituted pyrrole, pyrazole, imidazole, triazole, indole or indazole, hydroxyalkyl and aminoalkyl ring-substituted pyridazine, pyrimidino, pyrazino or quinoxalino; B. 0.1 to 5% by weight of an anionic fluorinated surfactant represented by the formula

R_fQ_mZ

wherein

R_f is a fluorinated saturated monovalent non-aromatic radical containing from 3 to 20 carbon atoms in which the carbon atoms of the chain are substituted only by fluorine, chlorine or hydrogen atoms with no more than one hydrogen or chlorine atom for every two carbon atoms, and in which a divalent oxygen or trivalent nitrogen atom, bonded only to carbon atoms, can be present in the skeletal chain;

Q_m, where m is an integer of 0 to 1, is a multivalent linking group comprising alkylene, sulfonamido alkylene and carbonamido alkylene radicals; and Z is a water solubilizing polar group comprising anionic radicals;

C. 0.1 to 25% by weight of an ionic non-fluorochemical water soluble surfactant selected from anionic, cationic and amphoteric surfactants wherein

1. anionic surfactants are selected from carboxylic acids, sulfuric esters, alkane sulfonic acids and alkylaromatic sulfonic acids,

2. cationic surfactants are selected from amine salts and quaternary ammonium compounds, and

3. amphoteric surfactants which contain in the same molecule an amino group and a group selected from carboxy, sulfuric ester, alkane sulfonic acid and aromatic sulfonic acid group or aminimides;

D. 0.1 to 40% by weight of a nonionic nonfluorochemical surfactant selected from polyoxyethlylene derivatives of alkylphenols, linear or branched alcohols, glucosides and block polymers of polyoxytheylene and polyoxypropylene;

E. 0 to 70% by weight of a solvent selected from ether alcohols or alcohols, and

F. water in the amount to make up the balance of 100%, said concentrate, upon dilution with water, being capable of forming a foam which drains to form a tough, durable, film on the surface of a flammable liquid thereby inhibiting the release of vapors therefrom.

4,042,523

OLEFIN-THIONOPHOSPHINE SULFIDE REACTION PRODUCTS, THEIR DERIVATIVES AND USE THEREOF AS OIL AND FUEL ADDITIVES

Stanley J. Brois, Westfield, N.J., assignor to Exxon Research and Engineering Co., Linden, N.J.

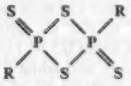
Continuation of Ser. No. 452,955, March 20, 1974, abandoned. This application Oct. 14, 1975, Ser. No. 622,161

Int. Cl.² C10M *1/48*

U.S. Cl. 252—32.7 HC **10 Claims**

1. An oleaginous composition comprising a major amount of an oleaginous material selected from the group consisting of lubricating oil and normally liquid petroleum fuel, and a minor amount, in the range of about 0.001 to 10 wt. %, of a sludge dispersant which is the reaction product of:

I. an oil soluble olefin-thionophosphine sulfide adduct of (1) an olefin having at least six carbon atoms and at least one double bond, and (2) a dimeric thionophosphine sulfide having the structure:



wherein, R is an organic radical selected from the group consisting of anisyl, thienyl, C_1 to C_{18} alkyl, C_6 to C_{18} cycloalkyl, and C_6 to C_{18} aryl radicals which may be unsubstituted or hydroxy substituted; said adduct being formed by heating said olefin and said sulfide together, under anhydrous conditions, at a temperature in the range of about 100° to 250° C., with the evolution of H_2S, said olefin being selected from the group consisting of:

a. short chain hydrocarbon mono-olefin of 8 to 50 carbon atoms;

b. long chain unsaturated hydrocarbon polymers of C_2 to C_5 mono-olefins, said polymers having a molecular weight in the range of 400 to 100,000; and

c. copolymers of about 30 to 85 mole % ethylene, about 15 to 70 mole % C_3 to C_5 mono-alpha olefin, and about 2 to 15 mole % of C_4 to C_{14} non-conjugated diene; and wherein said adduct is the reaction to product of sub-

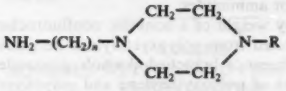
stantially equimolar proportions of said sulfide with said olefins of group (a) and group (b) above; and wherein said adduct is the reaction product formed by reacting in the range of about 0.05 to 1.0 molar proportion of said sulfide per molar proportion of said diene, when reacted with the olefin of group (c) above; with either

II. a polyamine, in a relative proportion of about 0.1 to 0.5 mole of polyamine per atom of phosphorus in said adduct, said polyamine containing 2 to 12 nitrogen atoms wherein pairs of nitrogen atoms are joined by alkylene groups of 2 to 4 carbon atoms, and are selected from the group consisting of polyamines defined by the formulae:

$$NH_2(CH_2)_n - [NH(CH_2)_n]_m - NH_2 \quad (a)$$

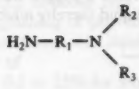
wherein: n is 2 to 4 and m is 0 to 10;

(b)



wherein *n* is 2 to 3 and R is selected from the group consisting of hydrogen and aminoalkyl radicals of 2 to 3 carbon atoms; and

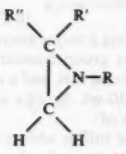
(c)



wherein R_1 is a C_2 to C_4 alkylene radical, and R_2 and R_3 are C_1 to C_3 alkyl radicals;

wherein a molar proportion of said adduct has been reacted, at a temperature in the range of 0° to 100° C., with said polyamine; or

III. an aziridine having the formula:

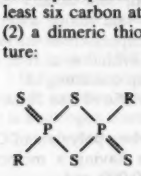


wherein each of said R, R' and R'' are selected from the group consisting of hydrogen, alkyl groups of 1 to 18 carbon atoms and aryl groups of 6 to 12 carbon atoms,

wherein a molar proportion of said adduct has been reacted at a temperature in the range of 0° to 100° C., with said aziridine in a relative proportion of about 0.5 to 1.0 mole of aziridine per atom of phosphorus in said adduct.

10. An oil concentrate comprising 35 to 90 wt. % of a mineral oil and 10 to 65 wt. % of a sludge dispersant which is the reaction product of:

I. an oil soluble additive comprising principally olefin-thionophosphine sulfide adduct of (1) an olefin having at least six carbon atoms and at least one double bond, and (2) a dimeric thionophosphine sulfide having the structure:



wherein, R is an organic radical selected from the group consisting of anisyl, thienyl, C_1 to C_{18} alkyl, C_6 to C_{18} cycloalkyl, and C_6 to C_{18} aryl radicals which may be unsubstituted or hydroxy substituted; said adduct being formed by heating said olefin and said sulfide together, under anhydrous conditions, at a temperature in the range of about 100 to 250° C., with the evolution of H_2S, said olefin being selected from the group consisting of:

a. short chain hydrocarbon mono-olefin of 8 to 50 carbon atoms;

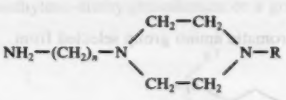
b. long chain unsaturated hydrocarbon polymers of C_2 to C_5 mono-olefins, said polymers having a molecular weight in the range of 400 to 100,000; and

c. copolymers of about 30 to 85 mole % ethylene, about 15 to 70 mole % C_2 to C_5 monp-alpha olefin, and about 2 to 15 mole of C_4 to C_{14} non-conjugated diene; and wherein said adduct is the reaction product of substantially equimolar proportions of said sulfide with said olefins of group (a) and group (b) above; and wherein said adduct is the reaction product formed by reacting in the range of about 0.05 to 1.0 molar proportion of said sulfide per molar proportion of said diene, when reacted with the olefin of group (c) above; and

II. a polyamine in a relative proportion of about 0.1 to 0.5 mole of polyamine per atom of phosphorus in said adduct, said polyamine containing 2 to 12 nitrogen atoms wherein pairs of nitrogen atoms are joined by alkylene groups of 2 to 4 carbon atoms, and being selected from the group consisting of polyamines defined by the formulae:

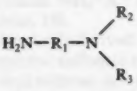
$$NH_2(CH_2)_n - [NH(CH_2)_n]_m - NH_2 \quad (a)$$

(b)



wherein: *n* is 2 to 4 and R is selected from the group consisting of hydrogen and aminoalkyl radicals of 2 to 3 carbon atoms; and

(c)



wherein R_1 is a C_2 to C_4 alkylene radical, and R_2 and R_3 are C_1 to C_3 alkyl radicals,

wherein a molar proportion of said adduct has been reacted, at a temperature in the range of 0° to 100° C., with said polyamine.

4,042,524

METHODS FOR ABSORPTION HEATING

Henry R. Nychka, East Aurora; Richard E. Eibeck, Orchard Park, and Chien C. Li, Williamsville, all of N.Y., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Apr. 10, 1975, Ser. No. 567,044

Int. Cl.[2] C09K 5/04

U.S. Cl. 252—69 **1 Claim**

1. In a heating method wherein a gaseous solute is dissolved in a solvent to release heat of solution in the vicinity of an area to be heated, the resulting solution is heated to release gaseous solute from the solvent, the released solute is condensed to form liquid solute and to release heat of condensation in the vicinity of the area to be heated and evaporating the resulting liquid solute at a location removed from the area to be heated, the improvement comprising using a fluorocarbon selected from the group consisting of dichloromonofluoromethane, monochlorodifluoromethane, trifluoromethane and monochloromonofluoromethane as the solute and 2-(t-butoxymethyl) tetrahydrofuran as the solvent.

4,042,525

IODOPHOR SOLUTION CONTAINING GLYCIDE POLYMER

Rolf Ackermann; Gerhard Morlock, and Gerhard Stehlik, all of Hanau, Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt am Main, Germany

Filed June 16, 1976, Ser. No. 696,669
Claims priority, application Germany, June 21, 1975, 2527701
Int. Cl.[2] C11D *3/48, 7/26*
U.S. Cl. 252—106 26 Claims

1. An iodophor solution comprising:

a. iodine in an amount of about 0.5 to about 4% by weight;

b. a glycide polymer in an amount of about 1.6 to about 15% by weight;

c. phosphoric acid in an amount of about 0 to about 30% by weight;

d. water in an amount sufficient so that said solution comprises 100% by weight; and

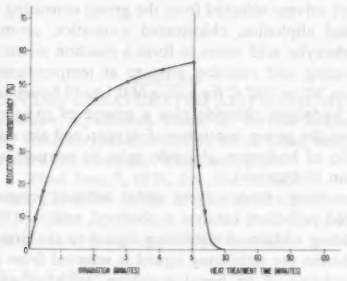
wherein the quotient of the weight of said glycide polymer to the weight of said iodine is at least 3.33.

4,042,526

NON-CRYSTALLINE SUBSTANCE HAVING AN OPTICAL MEMORY EFFECT

Yoshiyuki Asahara, Kawasaki, and Tetsuro Izumitani, Hino, both of Japan, assignors to Hoya Glass Works, Ltd., Tokyo, Japan

Continuation of Ser. No. 362,123, May 21, 1973, abandoned. This application Apr. 8, 1975, Ser. No. 566,577
Claims priority, application Japan, May 23, 1972, 47-50906
Int. Cl.[2] G11B *7/00*
U.S. Cl. 252—300 13 Claims



1. A method of storing information in an optically sensitive non-crystalline substance which comprises:

a. irradiating the non-crystalline substance with a high intensity light source to change its transmittance from one value to a second value, said non-crystalline substance comprising 25–65 atomic % of As, 25–65 atomic % of Se and additionally at least one of 0.1–10 atomic % of Zn, 0.1–8 atomic % of Au, and 0–32 atomic % of Ag and 0–25 atomic % of Cu, the total amount of Cu + Ag being 0.1–35 atomic %; the total being 100 atomic % in all;

b. discontinuing the irradiation of Step (a) so that said non-crystalline substance can retain said second value of transmittance and thereby act as a memory device for storing information, and

c. heating said non-crystalline substance to a temperature of 170°–200° C. to cause said second value of transmittance to return to said first value and thereby erase said stored information.

4,042,527

PROCESS OF PREPARING INFRARED-EXCITABLE SODIUM RARE EARTH FLUORIDE LUMINESCENT MATERIALS

Tsuyoshi Kano, Tokyo; Masaki Nakako, Hachioji; Hajime Yamamoto, Tokyo, and Yoshiro Otomo, Mitaka, all of Japan, assignors to Hitachi, Ltd., Japan

Filed May 22, 1972, Ser. No. 255,639
Claims priority, application Japan, May 21, 1971, 46-34480; Nov. 10, 1971, 46-89019
Int. Cl.[2] C09K *11/46*
U.S. Cl. 252—301.4 H 6 Claims

1. A method for producing a luminescent material consisting essentially of a sodium rare earth fluoride having a hexagonal crystal structure and a composition expressed by the following general formula:

$$NaLn_{1-y-z}Yb_yEr_zF_4$$

wherein Ln represents at least one element selected from the group consisting of yttrium, lanthanum, gadolinium and lutetium, and y and z are numerical values defined by the following relationship:

$$0.09 \leqq y \leqq 0.99,$$
$$0.01 \leqq z = 0.10, \text{ and}$$
$$Y + z \leqq 1,$$

said method comprising the steps of

a. preparing an acidic aqueous solution containing rare earth ions in a composition expressed by the following general formula:

$$Ln_{1-y-z}Yb_yEr_z$$

wherein Ln represents at least one element selected from the group consisting of yttrium, lanthanum, gadolinium and y and z are numerical values defined by the following relationships:

$$0.09 \leqq y \leqq 0.99,$$
$$0.01 \leqq z \leqq 0.10, \text{ and}$$
$$y + z \leqq 1,$$

b. adding a fluorine ion as a precipitant to said acidic aqueous solution and thereby coprecipitating said rare earth ions in the form of fluorides to form a first raw material consisting of a rare earth fluoride coprecipitate having a composition expressed by the following general formula:

$$Ln_{1-y-z}Yb_yEr_zF_3$$

wherein Ln, y and z are as defined above,

c. mixing the first raw material with sodium silicofluoride Na_2SiF_6 as a second raw material, the molar ratio of said second raw material to said first raw material being in the range of from 0.4 to 1.5, and

d. packing the resultant mixture in a crucible at the bottom of which powder of sodium silicofluoride Na_2SiF_6 has been charged in advance, in a manner such that the mixture of the raw materials is placed above the powder of sodium silicofluoride, and firing the contents of the crucible at a temperature of from 600° to 950° C. for a period of time of at least 1 hour in an oxygen-free atmosphere.

4,042,528

WATER-SOLUBLE DEFOAMING AGENTS

Akira Abe, Annaka, Japan, assignor to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Mar. 25, 1975, Ser. No. 561,686
Claims priority, application Japan, Mar. 29, 1974, 49-35215
Int. Cl.[2] B01D *19/04*
U.S. Cl. 252—358 11 Claims

1. A water-soluble defoaming agent for use in high temperature dyeing operations consisting essentially of

i. from 20 to 94% by weight of an organopolysiloxane-polyoxyalkylene copolymer represented by the general formula $G_aR_b^1SiO_{4-a-b/2}$

where G is a polyoxyalkylene group represented by the general formula $-R'-(OR'')_n-A_1$ where R′ is a divalent alkylene group having 1 to 10 carbon atoms, R″ is a divalent alkylene group having 2 to 10 carbon atoms, A^1 is a hydroxy group or a monovalent organic group selected from the class consisting of monovalent hydrocarbon groups, alkoxy groups, acyl groups, acyloxy groups and isocyanate groups, and m is a positive number; R^1 is a substituted or unsubstituted monovalent hydrocarbon group having 1 to 3 carbon atoms and halogen-substituted derivatives thereof, and a and b each are positive numbers with the proviso that $(a+b) = 1.9$ to 2.1, the ratio of said polyoxyalkylene groups denoted by G to said organopolysiloxane-polyoxyalkylene copolymer being in the range of from 0.3 to 0.8 by weight,

ii. from 5 to 50% by weight of a polyoxyalkyleneglycol derivative represented by the general formula

$$R^3-(OR^2)_n-A^2$$

where R^2 is a divalent alkylene group having 2 to 10 carbon atoms, R^3 is a saturated or unsaturated monovalent hydrocarbon group having 2 to 20 carbon atoms, A^2 is a hydroxy group or a monovalent organic group selected from the class consisting of monovalent hydrocarbon groups, alkoxy groups, acyl groups, acyloxy groups, and isocyanate groups, and n is a positive number, and

iii. from 1 to 30% by weight of a nonionic surface active agent having the polyoxyalkylene structure in its molecule and selected from the group consisting of polyoxyethylene sorbitan fatty acid esters, polyoxyethylene sorbitol fatty acid esters, polyoxyethylene fatty acid esters, polyoxyethylene aryl ethers, polyoxyethylene alkaryl ethers, castor oil modified with polyoxyethylenes, and polyoxyethylene-polyoxypropylene ethers with higher alcohols.

4,042,529

COMPOSITION AND METHOD FOR ENHANCING DISPERSIBILITY OF WATER SOLUBLE POLYMERS

Kenneth H. Nimerick, and Benny E. Simpson, both of Tulsa, Okla., assignors to The Dow Chemical Company, Midland, Mich.

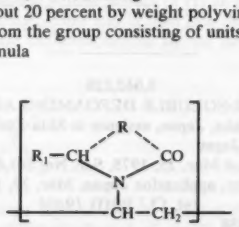
Filed July 11, 1974, Ser. No. 487,512
Int. Cl.² E21B *43/26;* **B01F** *3/20, 1/00*
U.S. Cl. 252—363.5 **8 Claims**

1. A water soluble polymeric composition comprising: a particulate mass of a water soluble organic polymer,

said water soluble organic polymer being a natural gum, a derivative of a natural gum, a cellulosic derivative, a starch derivative, or a polyacrylamide, of the type which tends to agglomerate when wetted with water but which, once dissolved in an aqueous liquid in an effective amount, thickens said aqueous liquid,

the individual particles of which are coated with a water-dispersibility and water-solubility affecting amount of a water soluble copolymer having a molecular weight ranging from about 300 to 2,000,000 containing

a. at least about 20 percent by weight polyvinyl lactam units selected from the group consisting of units corresponding to the formula



wherein R is an alkylene group containing a sufficient number of carbon atoms to form a heterocyclic ring containing from 5 to 7 members, and R_1 is hydrogen or a lower alkyl group, and

b. units of at least one other organic monomer, the polyvinyl lactam units being present in an amount sufficient to increase the dispersibility of the water soluble organic polymer in water, and the nature and proportion of the other organic monomer units being selected so as to modify the rate at which said dispersed organic polymer is dissolved in water.

4,042,530

OXYCHLORINATION SOURCES FOR REGENERATING DISPERSIONS OF LIGAND-STABILIZED, PALLADIUM (II) HALIDE COMPLEXES USED AS CARBONYLATION CATALYSTS

John F. Knifton, Poughquag, N.Y., assignor to Texaco Inc., New York, N.Y.

Continuation-in-part of Ser. No. 581,320, May 27, 1975. This application Nov. 28, 1975, Ser. No. 636,238
Int. Cl.² B01J *31/40, 27/32;* **C07C** *51/00;* **C11C** *3/02*
U.S. Cl. 252—415 **1 Claim**

1. A process for regenerating spent carbonylation catalyst of ligand-stabilized palladium(II) halide complexes in quaternary ammonium, phosphonium and arsonium salts of trihalostannate(II) or trihalogermanate(II), the spent catalyst being obtained from the carbonylation of olefins, wherein said ligand stabilized catalysts are selected from the group consisting of:

$[(C_2H_5)_4N][SnCl_3]$-$PdCl_2[P(C_6H_5)_3]_2$
$[(C_2H_5)_4N][SnCl_3]$-$PdCl_2[P(p\text{-}CH_3.C_6H_4)_3]_2$
$[ClCH_2(C_6H_5)_3P][SnCl_3]$-$PdCl_2[P(C_6H_5)_3]_2$
$[(n.C_4H_9)\ N][SnCl_3]$-$PdCk_2[P(C_6H_5)_3]_2$
$[(C_6H_5)_4As][SnCl_3]$-$PdCl_2[P\ (C_6H_5)_3]_2$
$[(C_2H_5)_4N][GeCl_3]$-$PdCl_2[P(C_6H_5)_3]_2$
$[(C_2H_5)_4N][SnCl_3]$-$PdCl_2[P(p\text{-}CH_3I.C_6H_4)_3]_2$, and
$[(C_7H_{15})_4N][GeCl_3]$-$PdCl_2[As(C_6H_5)_3]_2$, by the

a. mixing said spent palladium carbonylation catalyst with inert solvent selected from the group consisting of chlorinated aliphatics, chlorinated aromatics, aromatics and carboxylic acid esters to form a reaction mixture,

b. heating said reaction mixture at temperatures ranging from 20° to 200° C for a time of 0.1 to 48 hours, in a stream of hydrogen chloride plus a source of oxygen selected from the group consisting of oxygen and air, said volume ratio of hydrogen chloride ratio to oxygen or varying from 10:1 to 1:10,

c. removing excess solvent under reduced pressure until a dried palladium catalyst is obtained, and

d. adding additional stabilizing ligand to the dried catalyst wherein the stabilizing ligand is selected from the group consisting of tri henylphosphine, triphenylarsine, tri-p-tolylphosphine, and tri-p-methoxyphenylphosphine, said mole ratio of ligand added per gram atom of palladium varies from 1 to 10 moles of ligand per gram atom of palladium, until said spent ligand catalyst is regenerated.

4,042,531

OXIDATION CATALYST AND PROCESS

Ellis K. Fields, River Forest, Ill., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Oct. 28, 1976, Ser. No. 736,564
Int. Cl.² B01J *27/24, 27/08*
U.S. Cl. 252—438 **8 Claims**

1. An oxidation catalyst comprising a milled reaction product of an anhydrous transition metal halide with silver nitrite, the mole ratio of said metal halide to said silver nitrite being in the ratio of 1:1 to 1:5.

4,042,532

THERMALLY STABLE NICKEL-ALUMINA CATALYSTS USEFUL FOR METHANATION AND OTHER REACTIONS AND METHOD FOR THE MANUFACTURE OF SAID CATALYSTS

Dennis P. McArthur, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Continuation-in-part of Ser. No. 586,946, June 16, 1975, abandoned. This application Jan. 23, 1976, Ser. No. 651,645

Int. Cl.[2] B01J *21/04, 23/74*

U.S. Cl. 252—466 J 9 Claims

1. A method for the manufacture of a thermally stable nickel oxide-alumina catalyst which comprises:
   1. slurrying a powdered alumina hydrate in an aqueous solution of a nickel salt for a sufficient time to effect pore-saturation of said alumina hydrate with said solution, sufficient of said nickel salt being in the form of an ammino complex with ammonia to provide at least 2 moles of ammino ligands per mole of said nickel salt;
   2. heating the resulting slurry with agitation at a temperature and for a time sufficient to bring about a gradual decomposition of substantially all of said ammino complex with resultant liberation of ammonia and precipitation of substantially all of said nickel salt in the form of nickel hydroxide intimately composited with said powdered alumina hydrate; and
   3. drying and calcining the resulting composite at a temperature sufficiently high to convert said alumina hydrate to gamma alumina.

4,042,533

PRODUCING UNSATURATED ALIPHATIC ACIDS

Wilfrid G. Shaw, Lyndhurst; David B. Terrill, Bedford, and David R. Woodbury, Bedford Hts., all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed June 7, 1976, Ser. No. 693,256

Int. Cl.[2] B01J *23/22, 23/28, 23/30, 27/18*

U.S. Cl. 252—437 5 Claims

1. A catalyst having the empirical formula:

$$Mo_a V_b W_c X_d Y_e O_f$$

wherein

X is one or more of the elements selected from the group consisting of rhenium and titanium; and

Y is one or more of the elements selected from the group consisting of manganese, iron, copper, tin, zinc, aluminum, cobalt, nickel, phosphorus, cadmium, bismuth, silver, niobium, arsenic, chromium, the alkali and the alkaline earth elements, and

wherein the number of atoms of each element present is represented by *a* through *f*,

wherein

a is a number from 6 to 18;

b is a number from 0.1 to 10;

c is a number from 0.1 to 6;

d is a number from 0.01 to 5;

e is a number from 0 to 5; and

f is a number that satisfies the valence requirements of the other elements present.

4,042,534

CONDUCTING ANISOTROPIC POLYMER MATERIAL

Kuzma Andrianovich Andrianov, Vystavochny pereulok, 3, kv. 9, Moscow; Mikhail Izmailovich Topchiashvili, ulitsa Tashkentskaya, 27/12, pod'ezd, 3, Tbilisi; Lotary Mikhailovich Khananashvili, ulitsa Sumskaya, 6, korpus 2, kv. 244, Moscow; Dali Georgievna Pagava, ulitsa Tskhvedadze, 30, and Nikolai Alexandrovich Shermazanashvili, ulitsa Cheljuskintsev, 11, both of Tbilisi, all of U.S.S.R.

Filed Feb. 28, 1974, Ser. No. 447,051

Int. Cl.[2] H01B *1/06*

U.S. Cl. 252—511 2 Claims

1. A method of producing a conductive anisotropic polymer material comprising 20–50 weight parts of conductive black and 100 weight parts of the reaction product of perchlorovinyl resin and phenylaminomethyl-methyldiethoxysilane, comprising the steps of dissolving 100 weight parts of perchlorovinyl resin in 40–80 weight parts of dichloroethane; adding successively 10–100 weight parts of phenylaminomethyl-methyldiethoxysilane and 40–100 weight parts of conductive black to the resulting solution; stirring the mixture thus obtained, and rolling it at a temperature of 15° to 50° C.

4,042,535

METAL OXIDE VARISTOR WITH IMPROVED ELECTRICAL PROPERTIES

John E. May, Skaneateles, N.Y., assignor to General Electric Company, Syracuse, N.Y.

Filed Sept. 25, 1975, Ser. No. 616,854

Int. Cl.[2] H01B *1/06*

U.S. Cl. 252—518 8 Claims

1. A metal oxide varistor body comprising a plurality of grains which consist primarily of zinc oxide base material and are separated by a cellular intergranular region which consists primarily of a plurality of preselected additives wherein at least one of said additives is bismuth oxide, said varistor being characterized by a relatively high percentage of said bismuth oxide in being a body centered cubic phase.

4,042,536

INORGANIC-ORGANIC PLASTIC

Dieter Dieterich, Leverkusen; Peter Markusch, Cologne, both of Germany, and Helmut Reiff, New Martinsville, W. Va., assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Nov. 26, 1974, Ser. No. 527,386

Claims priority, application Germany, Nov. 30, 1973, 2359606

The portion of the term of this patent subsequent to Sept. 21, 1993, has been disclaimed.

Int. Cl.[2] C08G *18/38, 18/32*

U.S. Cl. 260—2.5 AK 14 Claims

1. A process for producing an inorganic-organic plastic with high strength, elasticity, dimensional stability under heat, and flame resistance, which is a composite material of a polymer/-polysilicic acid gel, said composite being in the form of a solid/solid xerosol, said process comprising mixing and reacting:

A. an organic polyisocyanate,

B. a silica composition selected from the group consisting of:

   i. an aqueous alkali metal silicate containing about 20 – 70% by weight of said alkali metal silicate;

   ii. an aqueous silica sol having a solids content from 20 to 50%, and

   iii. mixtures thereof,

C. an organic compound which contains

   i. at least one hydrogen atom capable of reacting with an isocyanate group, and

   ii. at least one group selected from the group consisting of:

      a. an ionic group,

      b. a group capable of forming an ionic group in the presence of an alkali metal silicate, and

      c. non-ionic hydrophilic groups, said non-ionic hydrophilic groups being polyether groups which are built

up from ethylene oxide to an extent of at least 10% by weight, with the proviso that if said organic compound contains non-ionic hydrophilic groups, said organic compound contains only one hydrogen atom capable of reacting with an isocyanate group,

said mixing being carried out in such a way that either components (B) and (C) are mixed prior to mixing with (A), or components (A), (B) and (C) are mixed simultaneously.

14. The product of the process produced by claim **1.**

4,042,537

PROCESS FOR THE PRODUCTION OF POLYURETHANE FOAMS

Manfred Dahm, Bergisch Neukirchen, and Alberto Carlos Gonzalez-Dorner, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed May 15, 1975, Ser. No. 578,051

Claims priority, application Germany, May 17, 1974, 2423984; Mar. 27, 1975, 2513816

Int. Cl.[2] C08G *18/14, 18/28*

U.S. Cl. 260—2.5 AP **18 Claims**

1. A process for the production of polyurethane foam comprising reacting in the presence of a blowing agent:

a. an organic polyisocyanate, and

b. a dispersion of a polyurea and/or a polyhydrazodicarbonamide in a relatively high molecular weight organic compound containing at least one hydroxyl group, wherein the concentration of the polyureas and/or polyhydrazodicarbonamide is from 1 to 40% by weight of the dispersion based on 100 parts by weight of said organic compound.

4,042,538

SUGAR P-VINYLBENZOYL ESTER AND COPOLYMERS THEREOF

Timothy John Lucas, London, England, assignor to Tate & Lyle Limited, London, England

Filed Apr. 11, 1975, Ser. No. 567,140

Claims priority, application United Kingdom, Apr. 16, 1974, 16579/74

Int. Cl.[2] C07H *15/00;* **C08L** *5/00*

U.S. Cl. 260—17.4 SG **8 Claims**

1. A derivative of a sugar selected from the group consisting of monosaccharides and disaccharides, in which at least one of the hydroxy groups of said sugar has been replaced by a p-vinylbenzoyloxy group.

8. A copolymer of an ethylenically unsaturated sugar derivative with another ethylenically unsaturated monomer, where in the sugar derivative is selected from the group of monosaccharides and disaccharides having at least one of their hydroxy groups replaced by a p-vinyl benzoyloxy group, and wherein the sugar derivative is present in the copolymer in an amount not greater than 5 mole percent when it is a derivative of a disaccharide and not greater than 10 mole percent when it is a derivative of a monosaccharide, and where in said another ethylenically unsaturated monomer is styrene or methyl methacrylate and wherein the copolymer has a glass transition temperature of 90.3° to 126° C.

4,042,539

PRIMER-SURFACER COMPOSITION OF AN ACRYLIC POLYMER, A POLYESTER RESIN AND AN ORGANIC DISPERSANT

Herbert H. Fanning, Bryn Mawr, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 350,645, April 12, 1973, abandoned. This application Oct. 30, 1975, Ser. No. 627,461

Int. Cl.[2] C08K *5/01, 5/04;* **C08L** *1/14, 67/02*

U.S. Cl. 260—16 **11 Claims**

1. A primer-surfacer composition comprising 10–60% by weight of a binder and 40–90% by weight of a solvent for the binder; wherein the binder consists essentially of

A. 75.0–95.0% by weight, based on the weight of the binder, of an acrylic polymer in solution consisting essentially of

1. 70–90% by weight of methyl methacrylate,

2. 9–19% by weight of an alkyl methacrylate having 2–8 carbon atoms in the alkyl group or an alkyl acrylate having 2–12 carbon atoms in the alkyl group, and

3. 1–11% by weight of either acrylic acid or methacrylic acid that is reacted with 1-8% by weight of an alkylene imine;

b. 4.9–24.9% by weight, based on the weight of the binder, of a polyester resin in solution which is the esterification product of

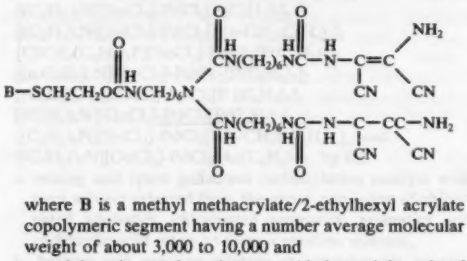
25 to 48 mole percent of a saturated aliphatic dicarboxylic acid selected from the group consisting of adipic acid, succinic acid, malonic acid, glutaric acid, sebacic acid, and azelaic acid;

40 to 50 mole percent of a glycol selected from the group consisting of ethylene glycol and neopentyl glycol; and

2 to 35 mole percent of an aromatic carboxylic acid constituent selected from the group consisting of benzoic acid, paratertiary butyl benzoic acid, phthalic acid, phthalic anhydride or mixtures thereof;

wherein the polyester has a hydroxyl number of not greater than 15 and an acid number of not greater than 10;

C. 0.1–5.0% by weight, based on the weight of the binder, of an organic pigment dispersant consisting essentially of a material represented by the structure



where B is a methyl methacrylate/2-ethylhexyl acrylate copolymeric segment having a number average molecular weight of about 3,000 to 10,000 and

containing pigment in a pigment to binder weight ratio of about 100:100 to about 600:100.

11. The primer surfacer composition of claim **6** containing in addition to the binder constituent up to 20% by weight of cellulose acetate butyrate, based on the weight of the binder; wherein the cellulose acetate buryrate has a butyryl content of about 30–60% by weight and a viscosity of about 2–25 seconds measured at 25° C. determined according to ASTM-D-1343-56.

4,042,540

PROCESS FOR THE MANUFACTURE OF HIGHLY ELASTIC SOFT POLYURETHANE FOAMS

Helmut Lammerting, Herbede; Rolf-Dieter Langenhagen, Hattingen-Niederwenigern; Gerd Rossmy, Haltern, and Peter Zäske, Essen-Bredeney, all of Germany, assignors to Th. Goldschmidt AG, Essen, Germany

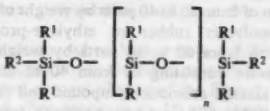
Filed Aug. 26, 1975, Ser. No. 607,913

Claims priority, application Switzerland, Aug. 30, 1974, 11814/74

Int. Cl.[2] C08G *18/14*

U.S. Cl. 260—2.5 AH **13 Claims**

1. In a process of producing cold cure soft polyurethane foams, wherein polyethers having at least two hydroxy groups per molecule, water and organic polyisocyanate are foamed in the presence of catalysts, the foaming system optionally comprising cross-linkers, blowing agents and/or other auxiliaries, the improvement which comprises adding to the foaming system organopolysiloxane of the formula I



wherein

R^1 represents the same of different unsubstituted or substituted hydrocarbon groups which are devoid of groups that have a tendency to enter addition reactions with isocyanate;

R^2 has the same meaning as R^1 or is OR^3, wherein

R^3 represents alkyl, aryl, alkaryl or $[C_mH_{2m}O]_pR^4$,

R^4 being lower alkyl,

m = 2 to 4 and

p being selected such that the mole weight of the total R^3 group does not exceed 400; and

n = 2–10 and wherein essentially none of the individual components of the mixtures possess a value of $n > 10$,

the amount of the compound of formula I being between about [0,003] 0.003 to 2% by weight calculated on the amount of polyether in the foaming system.

4,042,541

EXPANDABLE POLYSTYRENE PARTICLES

Harry Watts, Sarnia, Canada, assignor to The Dow Chemical Company, Midland, Mich.

Filed Dec. 13, 1976, Ser. No. 750,068
Int. Cl.² C08J *9/22*
U.S. Cl. 260—2.5 B **3 Claims**

1. In a mass of expandable polystyrene particles of a size suitable for molding, the particles containing 3 to 10 parts per hundred parts of polystyrene, a volatile fluid-foaming agent selected from the group consisting of n-pentane, isopentane and mixtures thereof and generally uniformly dispersed within the particles from about 100 to 300 parts per million of stearic acid based on total weight of the resinous composition and calcium stearate in a proportion of from about 40 to 120 parts per million based on the total weight of the composition.

4,042,542

PROCESS FOR REMOVING POLYMER FROM REACTION MIXTURE

Ki Soo Kim, Irvington, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Sept. 15, 1975, Ser. No. 613,143
Int. Cl.² C08L *89/00*
U.S. Cl. 260—6 **8 Claims**

1. A process for removing a polymer formed by reacting an organo-phosphonic dichloride or dibromide, a dihydroxy aromatic compound, and, optionally, a crosslinking monomer in an inert organic solvent to form a reaction mixture of said inert solvent and said polymer product which comprises:

a. combining said reaction mixture with an aqueous slution containing an effective amount of a suspending agent for later precipitation of said polymer product in granular form;

b. removing said organic solvent from the mixture resulting from step (a) while said mixture is being agitated to thereby affect precipitation of the polymer product in solid granular form; and

c. separating the precipitated polymer product and the supernatant formed thereby.

4,042,543

MATERIAL FOR STOPPERS

Robert L. Strickman, 729 Handwerg Drive, River Vale, N.J. 07675, and Melvyn B. Strickman, Academy St., Shiloh, N.J. 08353

Filed Feb. 13, 1976, Ser. No. 658,019
Int. Cl.² C08L *5/00*
U.S. Cl. 260—17.4 R **15 Claims**

1. A composition for forming stoppers for bottles, containing 1 part by weight of natural cork particles and from about 0.1 to 10 parts by weight of a polymer powder composed of particles of a polymer selected from a group consisting of polyethylene, ethylene-vinyl acetate copolymer, and a mixture of the polyethylene and the ethylene-vinyl acetate copolymer, the particles of the natural cork ranging in size from about 0.2 to 10 mm.

4,042,544

CHROMATED POLYAMIDE RESINS AS CURING AGENTS FOR EPOXY RESINS, AND THEIR CURED CORROSION-RESISTANT REACTION PRODUCTS

Eli Simon, 7175 Little Harbor Drive, Huntington Beach, Calif. 92648

Filed Apr. 8, 1976, Ser. No. 675,066
Int. Cl.² C08G *69/26*
U.S. Cl. 260—18 PN **3 Claims**

1. Curing agents for epoxy resins which are prepared at a temperature not to exceed 50° C by mechanically mixing for about 5 minutes an aqueous solution of 1 mole of chromium trioxide to 5–75 moles water with 2–4 amine values of a fluid reactive polyamide having an amine value of between 230–400.

4,042,545

NOVEL PRINTING INKS FOR SUBLIMATION TRANSFER PRINTING

Raymond Défago, Riehen; Arnulf Ruediger Läpple, Arlesheim, and Carl Becker, Basel, all of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

Filed June 11, 1975, Ser. No. 586,131
Claims priority, application Switzerland, June 13, 1974, 8083/74; Feb. 13, 1975, 1789/75
Int. Cl.² C09D *11/06, 11/08, 11/14, 11/10*
U.S. Cl. 260—13 **9 Claims**

1. Printing inks for sublimation transfer printing which contain

a. at least one sublimable cationic dye or a mixture of cationic dyes the cationic character of which is derived from a carbonium, ammonium, oxonium or sulphonium group, the solubility of the cationic dyes in the printing ink being not more than 10g/l and said cationic dyes being present in the form of a fine dispersion;

b. a soluble resin component which comprises at least one soluble resin said component functioning as stabilizer, film former and thickener, which component stabilizes the dyestuff dispersion so that no sedimentation or creaming occurs, ensures the reversibility of the dispersion in case small amounts of printing ink dry out and fall back into the ink, gives the colour sufficient body and ensures a good film quality without increasing the viscosity above the level still permissible for printing, rapidly releases the solvent and does not become tacky, does not retain the dye during transfer and withstands the requisite transfer printing temperatures of up to 230° C without undergoing modification or decomposition;

c. a low viscosity, low molecular organic solvent or solvent mixture in which the cationic dye or dyes are only slightly soluble at room temperature and the resin component is at least 5% soluble selected from the group of low molecular aliphatic hydrocarbons and chlorinated hydrocarbons with a boiling point between 80° and 180° C, the first members of the aliphatic alcohols and ether alcohols, and mixtures of these types of solvent;

d. at least one inorganic acid acceptor selected from the group of hydroxides, oxides, carbonates and alcoholates of alkali metals and alkaline earth metals, or organic acid acceptor selected from the group of amines and tetraalkylammonium hydroxides; and

e. about 0.1 to 10 percent by weight, based on the cationic dye of at least one indicator dye or dyestuff mixture which is inert to inorganic or organic acid acceptors, which has the same shade as that of the cationic dyes and which does not itself transfer into the textile material.

4,042,546

REACTIVE POLYESTER-AMIDE POLYMERS AS CO-REACTANTS OR CURING AGENTS FOR POLYEPOXIDES AND POLYISOCYANATES

Eli Simon, 7175 Little Harbor Drive, Huntington Beach, Calif. 92648

Filed May 3, 1976, Ser. No. 682,474
Int. Cl.[2] C08G *69/44*; C09D *3/70, 3/72*
U.S. Cl. 260—22 R **3 Claims**

1. Reactive polyester-amide polymers having an acid number of 25–100, as co-reactants for polyepoxides and polyisocyanates, prepared from reactants consisting of: 1-mol of a triol selected from the group consisting of glycerol, tris(2-hydroxyethyl)isocyanurate, 1-2-4-hexanetriol, trimethylol propane, and trimethylol ethane; 1-mol of an amino-alcohol selected from the group consisting of 2-amino-1-butanol, and 2-amino-2-methyl-1-propanol; and 2-moles of an aliphatic dibasic acid selected from the group consisting of adipic, pimelic, suberic, azelaic, and sebacic acids.

4,042,547

ENVIRONMENTALLY HARMLESS STOVING LACQUER SYSTEMS BASED ON ALKYD RESINS CONTAINING CONDENSED MONOHYDRIC ALCOHOLS

Bernd-Ulrich Kaiser; Rolf Dhein; Hans Rudolph, and Rolf Kuchenmeister, all of Krefeld, Germany, assignors to Bayer Aktiengesellschaft, Germany

Continuation-in-part of Ser. No. 659,251, Feb. 19, 1976, abandoned, which is a continuation of Ser. No. 460,991, April 15, 1977, abandoned. This application Aug. 16, 1976, Ser. No. 714,784
Claims priority, application Germany, Apr. 18, 1973, 2319635; Sept. 13, 1973, 2346130; Feb. 19, 1974, 2407791
Int. Cl.[2] C09D *3/64, 3/66*
U.S. Cl. 260—22 R **6 Claims**

1. A water-insoluble product consisting essentially of the condensation product of an aliphatic or cycloaliphatic polyalcohol having 2 to 15 carbon atoms, an aromatic, cycloaliphatic or aliphatic dicarboxylic acid, from 0 to 40% by weight of a monocarboxylic acid and from 5 to 35% by weight of a saturated monohydric alcohol having from 1 to 3 carbon atoms, said condensation product having a molecular weight of between 500 and 2000, an acid number of 3 to 40 and an OH number of 40 to 300 and being soluble in lacquer solvents selected from the group consisting of hydrocarbons, alcohols, esters and ketones.

4,042,548

HIGHLY WEATHER-RESISTANT, THERMOFORMABLE SHEETING

Mitsuo Abe; Masaki Nagata, and Masafumi Kikuchi, all of Yokkaichi, Japan, assignors to Japan Synthetic Rubber Company Limited, Tokyo, Japan

Filed Oct. 15, 1975, Ser. No. 622,513
Claims priority, application Japan, Oct. 21, 1974, 49-121174
Int. Cl.[2] C08K *5/12, 5/15*
U.S. Cl. 260—23 XA **10 Claims**

1. A highly weather-resistant, thermoformable sheeting prepared by mixing (a) from 45 to 70 parts by weight of a rigid thermoplastic resin selected from the group consisting of polyvinyl chlorides and copolymers each of which is composed mostly of vinyl chloride and a small amount of a monoolefinic monomer copolymerizable with the vinyl chloride, from 20 to 50 parts by weight of a thermoplastic resin obtained by a graft polymerization of from 20 to 40 parts by weight of an ethylene-propylene copolymer rubber or ethylene-propylene-diene terpolymer with from 60 to 80 parts by weight of a vinyl monomer mixture consisting of from 40 to 90 percent by weight of an alkenyl aromatic compound and from 10 to 60 percent by weight of at least one monomer copolymerizable with the alkenyl aromatic compound, and from 5 to 35 parts by weight of an acrylonitrile-butadiene rubber, with (b) from 5 to 50 parts by weight of a plasticizer or plasticizers for polyvinyl chloride added to 100 parts by weight of the resinous mixture (a).

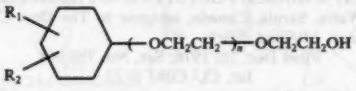
4,042,549

STABILIZERS FOR VINYL HALIDE RESINS CONTAINING A METAL HALIDE AND AN ETHOXYLATED ALKYLPHENOL

Robert L. Ahr, and Philip H. Rhodes, both of Cincinnati, Ohio, assignors to Emery Industries, Inc., Cincinnati, Ohio

Filed Sept. 30, 1975, Ser. No. 618,256
Int. Cl.[2] C08J *3/20*
U.S. Cl. 260—23 XA **11 Claims**

1. An improved liquid stabilizer for vinyl halide resins which comprises 0.5 to 18% by weight of (a) a Group II metal halide; 0.25 to 6% by weight of (b) sufficient water to dissolve said metal halide; and 44.25 to 99.25% by weight of (c) an ethoxylated alkylphenol of the formula



wherein R_1 is an alkyl radical containing from 6 to 18 carbon atoms, R_2 is hydrogen or an alkyl radical as defined for R_1 and n is an integer from 1 to 5.

4,042,550

ENCAPSULANT COMPOSITIONS BASED ON ANHYDRIDE-HARDENED EPOXY RESINS

Harold W. Tuller, Long Valley, and Ralph W. Nussbaum, West Orange, both of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Filed Nov. 28, 1975, Ser. No. 636,189
Int. Cl.[2] C08L *91/00*
U.S. Cl. 260—280 P **14 Claims**

1. An epoxy molding composition, suitable for use as an encapsulant having improved high temperature wet electrical properties, comprising:

a. an epoxide compound having at least two 1,2-epoxide groups;

b. a hardener therefor selected from the group consisting of (1) a polyanhydride having a molecular weight below about 1,000 and being the reaction product of a maleic monomer and at least one alkyl styrene monomer and (2) prepolymers of said polyanhydride with said epoxide compound;

c. a catalyst to promote the curing thereof;

d. about 55 to 75% by weight, based on the weight of the composition, of a silica filler;

e. about 10 to 20% by weight, based on the weight of the composition, of an additional filler selected from the group consisting of calcined clay, antimony trioxide, antimony tetraoxide, calcium silicate, titanium dioxide, calcium carbonate, zinc oxide, magnesium oxide, or mixtures thereof;

f. about 0.05 to 2% by weight, based on the weight of the composition, of a silane coupling agent; and

g. about 0.01 to 2% by weight, based on the weight of the

composition, of a lubricant selected from the group consisting of carnauba wax, montanic acid ester wax, polyethylene wax, polytetrafluoroethylene wax and mixtures thereof,

said composition, when heat cured, exhibiting improved high temperature wet electrical properties as indicated by a decreased percent change of the Dielectric Loss Index measured after exposure to 15 psig steam for 16 hours from the Dielectric Loss Index measured under dry conditions at 25° C.

4,042,551
POLYMERIC POLYBLENDS HAVING IMPROVED MELT FLOW

Robert L. Kruse, Springfield, Mass., assignor to Monsanto Company, St. Louis, Mo.

Filed Apr. 19, 1976, Ser. No. 678,268
Int. Cl.² C08L *91/00*
U.S. Cl. 260—28.5 B **13 Claims**

1. A polymeric polyblend having high melt flow comprising, based on the total weight of the polyblend:

A. about 80 to 98.5 weight percent of a mono-alkenyl aromatic polymer, comprising at least one monoalkenyl aromatic monomer of the formula:

where Ar is selected from the group consisting of phenyl, halophenyl alkylphenyl, alkylhalophenyl and mixtures thereof and X is selected from the group consisting of hydrogen, halogen and an alkyl radical of less than three carbon atoms and mixtures thereof,

B. about 1 to 15 percent by weight of a diene rubber moiety dispersed as grafted diene rubber particles, said rubber particles being grafted with and having occluded said monovinylidene aromatic polymer, wherein said grafted diene rubber particles has said grafted and occluded polymer present in an amount of 0.5 to 4 parts to 1 part of rubber, are crosslinked having a swelling index of 5–25 and a weight average particle size diameter of 0.1 to 20.0 microns, and

C. about 0.5–5 percent by weight of a polyethylene wax having a molecular weight of from about 500 to 2400 and a dispersion index of from 1–5.

4,042,552
COMPOSITION FOR HYDROPHILIC LENS BLANK AND METHOD OF CASTING

Bernard J. Grucza, Buffalo, N.Y., assignor to Warner-Lambert Company, Morris Plains, N.J.

Continuation of Ser. No. 419,228, Nov. 27, 1973, abandoned, which is a division of Ser. No. 290,376, Sept. 19, 1972, Pat. No. 3,807,398. This application Nov. 14, 1975, Ser. No. 631,997
The portion of the term of this patent subsequent to Apr. 30, 1991, has been disclaimed.
Int. Cl.² C08L *33/10*
U.S. Cl. 260—29.6 RB **1 Claim**

1. A contact lens composition which can be subjected to cutting and thereafter hydrated in a buffered saline solution to provide a dimensionally-stable contact lens and also suitable for medicament delivery to the eye having from 50 to 65% water after hydration, said composition in dry form consisting essentially of polymerized random graft copolymer containing:

1. from 67.2% to 79.3% hydroxy ethyl methacrylate;
2. 14.25% to 28% polyvinyl pyrrolidone;
3. from 0.1% to 4.04% ethylene glycol dimethacrylate;
4. from 0.1% to 2.5% methacrylic acid;
5. from about 0.1% up to 5.0% water, and
6. from 50 to 100 ppm of hydroquinone stabilizer;

said composition having been polymerized in two stages;

the first stage being carried out with a low temperature peroxide initiator effective at 40° to 60° C after an induction period modified by said hydroquinone stabilizer at 15° to 30° C for a period of 2.5 to 6 hours;

said second stage being carried out with a high temperature peroxide initiator effective at 90° to 120° C;

each of said low temperature initiator and high temperature initiators being present in concentrations of 0.05% to 0.15%; and

said two stages of polymerization being carried out for a total period of at least 4 hours or longer.

4,042,553
THERMOSETTING VINYL ESTER EMULSION COPOLYMERS

Martin K. Lindemann, Greenville, S.C., assignor to Chas. S. Tanner Co., Greenville, S.C.

Continuation-in-part of Ser. No. 142,406, May 11, 1971, abandoned. This application Mar. 12, 1973, Ser. No. 340,535
Int. Cl.² C08L *33/04*
U.S. Cl. 260—29.6 H **7 Claims**

1. An aqueous emulsion comprising an aqueous medium having colloidally suspended therein an aqueous emulsion copolymer consisting essentially of at least 85% of the copolymer of vinyl ester with a saturated aliphatic monocarboxylic acid containing up to 18 carbon atoms, and from 0.5–15% of the copolymer of monomers providing thermosetting characteristics and consisting essentially of mono N-methylol allyl carbamate.

4,042,554
PROCESS FOR THE PREPARATION OF A STORAGE STABLE MASTIC ADHESIVE

Ralph Leroy Poskitt, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 3, 1975, Ser. No. 609,996
Int. Cl.² C08L *11/02*
U.S. Cl. 260—29.7 NR **10 Claims**

1. A process for the preparation of a mastic adhesive having improved storage stability which comprises (A) blending a high solids content polychloroprene latex having toluene-insoluble gel content of at least 60% and a polychloroprene latex in which the polymer is at least almost completely soluble in toluene, the polychloroprene of the latex which is at least almost completely soluble in toluene having a Mooney viscosity (ML — 2¼, 100° C.) of 30 to 45, the ratio of polychloroprene from latex which is at least almost completely soluble in toluene to the ratio of polychloroprene from latex that has a toluene insoluble gel content of at least 60% being from 60/40 to 40/60, to form blend having a solids content of between about 50 and 65% by weight, (B) mixing said blend with an organic water-immiscible polychloroprene solvent containing an inert filler and dissolved adhesion promoting resin until the mixture has increased in viscosity to the mastic range and a water-in-oil dispersion is obtained.

4,042,555
BINDER COMPOSITION FOR ADHESIVES AND SEALANTS

Victor V. Raimondi, Naperville; Roy A. Fox, Bollingbrook, and Casey E. Piorkowski, Orland Park, all of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Filed May 12, 1975, Ser. No. 576,389
Int. Cl.² C08L *53/02*
U.S. Cl. 260—29.6 RB **9 Claims**

1. A water emulsified composition containing 100 phr of a styrene/elastomer block copolymer in which an elastomer midblock comprises 60 to 90% of the copolymer and is isoprene or ethylene-butylene, about 20 to 80 phr of a poly(alpha-methylstyrene) having a softening point between about 200°

and 300° F. and about 40 to 900 phr of a butylene polymer comprising 85–98% of mono-olefins.

4,042,556

PROCESS FOR THE PRODUCTION OF HARD VINYL CHLORIDE FOAMS

Mituji Yoshinaga, Tokyo, Japan, assignor to Central Glass Co., Ltd., Japan

Filed Apr. 29, 1975, Ser. No. 572,704
Claims priority, application Japan, May 23, 1974, 49-57317; May 31, 1974, 49-60767
Int. Cl.² C08J 9/10
U.S. Cl. 260—2.5 P 7 Claims

1. A process for the production of hard vinyl chloride resin foams, which comprises mixing a vinyl chloride resin foam forming composition comprising 100 parts by weight of vinyl chloride resin, 0.1 to 10 parts by weight of a stabilizer and 0.1 to 1.0 by weight of a foaming agent of organic decomposition type with at least one uniformly blended mixture comprising 100 parts by weight of vinyl chloride resin and 10 to 100 parts by weight of a foaming agent of organic decomposition type in a proportion of 1 to 30 parts by weight of the latter composition to 100 parts by weight of the former composition and then subjecting the resulting mixture to foaming.

4,042,557

PROCESS FOR PREPARING A HIGH CONCENTRATION OF TITANIUM DIOXIDE SLURRY IN DIMETHYLACETAMIDE OR DIMETHYLFORMAMIDE

William Leonard Dills, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 2, 1975, Ser. No. 609,714
Int. Cl.² C08K 3/22, 5/09, 5/20; C09C 1/36
U.S. Cl. 260—32.6 NR 9 Claims

1. A process for producing a slurry comprising:
   a. dissolving an acid selected from citric, tartaric, adipic, fumaric and maleic in a solvent selected from dimethylacetamide and dimethylformamide, and
   b. dispersing titanium dioxide in the acid-solvent solution,
   wherein the amount of titanium dioxide is about 60–83 weight percent based on the titanium dioxide and solvent, and the amount of acid is about 0.2–0.6 weight percent based on the titanium dioxide.

9. A process for producing a pigmented segmented polyurethane spinning solution comprising
   a. making the slurry of claim 5, and
   b. adding the slurry of claim 5 to the segmented polyurethane spinning solution containing about 10–40 parts by weight of a segmented polyurethane polymer and about 60–90 parts by weight of dimethylacetamide so that about 0.5–10 weight percent titanium dioxide is present based on the weight of the segmented polyurethane polymer.

4,042,558

FILLED POLYMERIZATION PRODUCTS BASED ON CARBODIIMIDE COPOLYMERS

Wulf von Bonin, Leverkusen; Lothar Preis, Cologne; Ulrich von Gizycki, and Manfred Dahm, both of Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed July 26, 1976, Ser. No. 708,805
Claims priority, application Germany, Aug. 16, 1975, 2536493
Int. Cl.² C08F 283/04; C08L 79/08, 75/00
U.S. Cl. 260—37 N 18 Claims

1. A process for the production of polymerization products comprising subjecting solutions of the reaction products of polycarbodiimides and α, β-unsaturated carboxylic acids in about 5 to 95 weight percent vinyl monomers to free-radical polymerization.

4,042,559

ABRASION RESISTANT COATED ABRASIVE PIPE LINING SHEET

Paul N. Abelson, Lewiston; Halsey W. Buell, Niagara Falls, and William E. Hallatt, Lewiston, all of N.Y., assignors to The Carborundum Company, Niagara Falls, N.Y.

Continuation of Ser. No. 237,314, March 23, 1972, abandoned. This application Nov. 29, 1974, Ser. No. 527,986
Int. Cl.² C08K 3/14, 3/22, 3/28, 3/38
U.S. Cl. 260—38 12 Claims

1. An abrasion resistant, coated and abrasion containing, pipe lining sheet having a thickness of not less than about 0.75 mm, a backing side with a relatively uneven surface, and being sufficiently flexible to be wound backing side inward around a mandrel in building a pipe or within a pre-existing pipe, said sheet including a backing, and a composite layer on said backing and consisting essentially if: (1) from about 30 to about 70% by volume of abrasive granules selected from the group consisting of the refractory metal borides, carbides, nitrides, oxides, and mixtures thereof, and (2) from about 70 to about 30% by volume of an at least partially cured organic resin binder, said composite layer being formed by a first binder coat on said backing and forming said smooth surface, a coating of said abrasive granules deposited on said first binder coat in a non-aligned orientation and compacted in said first binder coat under pressure, and a second binder coat covering said granules, merging with said first binder coat and forming said uneven surface, said granules having a minimum particle size of about 50 microns with most of said granules being somewhat larger, a maximum dimension of not more than about twice their minimum dimension and somewhat smaller than the thickness of said sheet, and such diverse size that all of the largest 50% by weight of said granules have at least 30% greater maximum dimension than all of the smallest 10% by weight thereof.

4,042,560

METHOD OF PREPARING HOMOGENEOUS THERMOSETTING POWDER PAINT COMPOSITIONS

Stephen Chung-Suen Peng, Rochester, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Continuation of Ser. No. 389,844, Aug. 20, 1973, abandoned. This application Nov. 5, 1975, Ser. No. 629,161
Int. Cl.² C08J 3/14
U.S. Cl. 260—42.28 17 Claims

1. A method of preparing a powder paint composition comprising:
   A. passing a liquid paint composition comprising a solution of
      1. a copolymer containing cross-linkable functional groups and having a glass transition temperature in the range of 40° C to 90° C and a number average molecular weight of between about 1000 and about 15,000;
      2. pigment; and
      3. inert solvent through an evaporating zone comprising a tortuous path of relatively narrow cross-section, elongated in a direction lateral to the direction of flow of said solution through said zone;
   B. heating said solution while it is confined within said evaporating zone to a temperature
      1. above the melting point of said copolymer, but below the point at which degradation occurs;
      2. above the temperature at which said inert solvent begins to vaporize thus inducing turbulent flow of said solution within said evaporating zone and thereby maintaining an intimate homogeneous mixture of the vapors of the volatile components of said solution and dispersed particles of nonvolatile components of said solution;
   C. passing said homogeneous mixture from said evaporating zone into a separating zone and, while maintaining the temperature within said separating zone above the melting point of said copolymer, causing said solvent vapor to be

removed from said separating zone and allowing said non-volatile components to collect in a molten state;

D. removing said nonvolatile components from said separating zone;

E. cooling said nonvolatile components to form a solid material;

F. granulating said solid material to form uniformly pigmented particles;

G. blending a crosslinking agent for said copolymer with said particles;

H. mixing said blend at a temperature greater than the melting point of said particles and said crosslinking agent but below the point at which crosslinking occurs so as to form a molten mass having crosslinking agent uniformly dispersed therein;

I. cooling said molten mass to form a solid material; and

J. pulverizing said solid material to form a powder.

4,042,561

FLAME RETARDANT COMPOSITIONS CONTAINING POLYPHOSPHAZENES

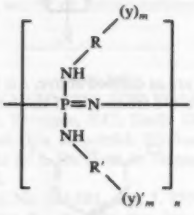
Andrew H. DeEdwardo, Parsippany; Fred Zitomer, Livingston; Robert W. Stackman, Morristown, and Charles E. Kramer, Florham Park, all of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed May 20, 1976, Ser. No. 688,363

Int. Cl.² C08K 5/49

U.S. Cl. 260—45.9 NP **25 Claims**

1. A flame retardant composition comprising a normally flammable organic material selected from the group consisting of polyester resins, polyamide resins, cellulosic resins, polyolefins and their substituted derivatives, vinyl aryl polymers, polycarbonate resins, polyurethane resins and mixtures of the foregoing, and a flame retardant amount of a polyphosphazene compound corresponding to the formula:



when *n* is at least 10, R and R′ may be the same or different and represent aryl groups, *y* and *y*′ may be the same or different and represent halogen and halogen substituted and unsubstituted alkyl, aryl, alkoxy, aryloxy groups, and *m* = 0 to 10, which compound exerts a flame retardant effect in the gas phase and the bulk phase.

4,042,562

NITROGEN-CONTAINING AROMATIC HETEROCYCLIC COMPOUNDS AS ANTI-OXIDANTS

Kurt Hofer, Munchenstein, and Guenther Tscheulin, Riehen, both of Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

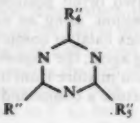
Continuation-in-part of Ser. No. 415,368, Nov. 13, 1973, abandoned. This application Oct. 6, 1975, Ser. No. 620,535

Claims priority, application Switzerland, Nov. 15, 1972, 16602/72

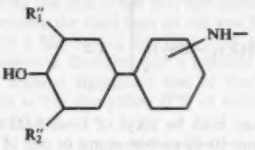
Int. Cl.² C08K 5/35; C07D 413/14, 413/04

U.S. Cl. 260—45.8 NT **6 Claims**

1. A compound of the formula



wherein R″ is a group of the formula



wherein R_1″ and R_2″ are each tert.butyl,

R_4″ is piperidino, morpholino or pyrrolidino, or has one of the significances of R″, and

R_5″ has one of the significances of R_4″,

with the proviso that the —NH— function of any group R″ is in a position ortho or para to the diphenyl bond.

5. A method of stabilizing a natural or synthetic polymeric material susceptible to oxidation which comprises treating said material with a compound of claim **1**, in sufficient amount to impart an anti-oxidant effect.

4,042,563

ENHANCING FLAME RETARDANCY WITH ARYLORGANOBROMOSILICONE COMPOUNDS

Terence J. Swihart, Essexville, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Sept. 22, 1976, Ser. No. 725,218

Int. Cl.² C08K 5/54

U.S. Cl. 260—45.9 K **7 Claims**

1. A method for enhancing the flame-retardant characteristics of a substrate which comprises adding to said substrate about 0.1 to 5.0 percent by weight of an arylorganobromosilicone compound having the general formula

wherein

x has an average value of from 2 to 3,

R′ is selected from the group consisting of ethylene, propylene and butylene radicals,

y has a value from 1 to 10,

R is selected from the group consisting of hydrocarbon radicals containing from 1 to 18 carbon atoms, fluorinated hydrocarbon radicals containing from 1 to 18 carbon atoms, chlorinated hydrocarbon radicals containing from 1 to 18 carbon atoms and cyanohydrocarbon radicals containing from 1 to 18 carbon atoms, and

z has a value of from 0 to 25.

4,042,564

METHOD FOR PREPARING POLYPHENYLENE ETHERS

James Gordy Bennett, Jr., and Glenn Dale Cooper, both of Delmar, N.Y., assignors to General Electric Company, Pittsfield, Mass.

Filed Nov. 11, 1975, Ser. No. 631,191

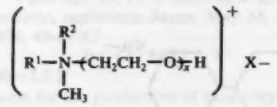
Int. Cl.² C08G 65/44

U.S. Cl. 260—47 ET **16 Claims**

1. In a process for the preparation of a high-molecular weight polyphenylene ether having a degree of polymerization

of at least 50 by oxidatively coupling a monovalent phenol having substitution in at least the two ortho positions and hydrogen or halogen in the para-position, using an oxygen-containing gas, a solvent and a complex catalyst comprising a metal salt and an amine as an oxidizing agent, the improvement which comprises adding to the reaction mixture from 0.001 to 0.2 percent by weight of reaction mixture a compound of the formula:

(I)



wherein R^1 and R^2 may both be alkyl of from 6–22 carbon atoms or alkenyl of from 10–22 carbon atoms or one of R^1 and R^2 may be $-(CH_2CH_2-O-)_xH$; x is an integer of from 1 to 40.

4,042,565

STRETCHED TUBULAR FILM OF POLYETHYLENE TEREPHTHALATE

Klaus Hoheisel, Wiesbaden, and Siegfried Janocha, Wiesbaden-Biebrich, both of Germany, assignors to Hoechst Aktiengesellschaft, Germany

Filed Dec. 18, 1975, Ser. No. 641,912

Claims priority, application Germany, Dec. 20, 1974, 2460395

Int. Cl.[2] C08G *63/66, 63/16*

U.S. Cl. 260—47 C **5 Claims**

1. An oriented, shrinkable, tubular film of polyethylene terephthalate which has a lower initial point of shrinkage, a shrinkage of more than 5 percent at 80° C, and improved weldability, in which part of the ethylene glycol component is replaced by about 0.5 to 10 mole percent of bis-phenol-A-bis-(2-hydroxyethyl)-ether.

4,042,566

POLYETHYLENIC POLYETHERS AND SOLVENT SOLUBLE COPOLYMERS THEREOF

Edward J. Murphy, Hoffman Estates, Ill., assignor to DeSoto, Inc., Des Plaines, Ill.

Filed June 11, 1976, Ser. No. 695,186

Int. Cl.[2] C07C *33/06;* C08F *16/00*

U.S. Cl. 260—47 EP **13 Claims**

1. A method of producing a polyethylenically unsaturated polyether comprising reacting a polyepoxide having a plurality of epoxy groups with about one mole of a bisphenol per epoxy equivalent in said polyepoxide to consume the epoxy functionality by reaction with the phenolic OH group in said bisphenol and provide an intermediate carrying phenolic OH terminal groups, and then reacting phenolic OH terminal groups in said intermediate with the epoxy group in a molar excess of an ethylenically unsaturated monoepoxide to provide a polyethylenic polyether.

4,042,567

S-TRIAZINE PREPOLYMERS AND A PROCESS FOR THEIR PRODUCTION

Rudolf Sundermann, Leverkusen, Germany, assignor to Bayer Aktiengesellschaft, Germany

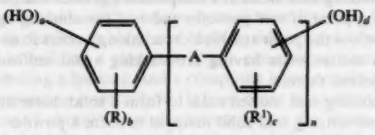
Filed Nov. 28, 1975, Ser. No. 635,589

Claims priority, application Germany, Dec. 4, 1974, 2457154

Int. Cl.[2] C08G *65/40*

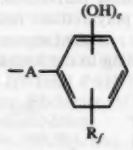
U.S. Cl. 260—49 **5 Claims**

1. A process for producing an s-triazine prepolymer which comprises condensing an aromatic polyhydroxy compound with 0.01 to less than ½ mol of a 4,6-dichloro-s-triazine per hydroxy group of said polyhydroxy compound and subsequently reacting the product of said condensation with a halogen cyanide in the presence of a base, the molar ratio of hydroxy groups to cyanogen halide to base being about 1:1:1, said condensation being carried out in the melt at a temperature of 100° to 250° C. or in solution or suspension in the presence of about 1 mol of base per mol of hydrogen chloride to be eliminated at a temperature of from about 0° to 150° C., said reaction of said condensation product with cyanogen halide in the presence of a base being carried out at a temperature of from −40° to 65° C., each of said bases being selected from the group consisting of tertiary amines, alkali metal hydroxides, alkali metal carbonates and alkali metal alcoholates, said polyhydroxy compound being of the formula

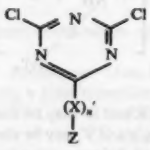


wherein a is 1, 2 or 3, b is 5 - a; c is 5 - d; d is 1, 2 or 3 with the proviso that $a + d$ is from 2 to 4 if n is 0 and is 2 to 6 if n is 1; n is 0, 1, 2 or 3; R is hydrogen, halogen, alkyl or phenyl; A is —O—, $-SO_2-$, —CO—,

a CH_2 chain having up to 6 carbon atoms, a CH_2 chain having up to 6 carbon atoms substituted by lower alkyl, a CH_2 chain having up to 6 carbon atoms substituted by phenyl, a divalent cycloaliphatic or aromatic 5- or 6-membered ring or a single bond and R^1 is the same as R or



wherein A and R are as defined above, e is 1, 2 or 3 and f is 5-e and said 4,6-dichloro-s-triazine is of the formula



wherein n' is 0 or 1; Z is hydrogen, alkyl or aryl; X is —O—, —S—, —NH— or —NZ'— and Z and Z' are alkyl, cycloalkyl or aryl.

4,042,568

PHOTODEGRADABLE POLYAMIDE COMPOSITIONS

James Edwin Guillet, 31 Sagebrush Lane, Don Mills, Ontario, and Dan Ervin, 376 Brunswick Avenue, Apartment 502, Toronto 4, Ontario, both of Canada

Division of Ser. No. 245,176, April 18, 1972, Pat. No. 3,878,169, which is a continuation-in-part of Ser. No. 135,426, April 19, 1971, abandoned. This application Mar. 3, 1975, Ser. No. 554,451

Claims priority, application United Kingdom, Apr. 27, 1970, 20102/70; July 15, 1970, 34238/70

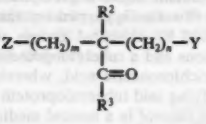
Int. Cl.[2] C08G *16/00*

U.S. Cl. 260—65 **9 Claims**

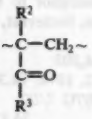
1. A condensation copolymer obtained by reacting together

at least one diamine of general formula $H_2N - R - NH_2$ wherein R is a divalent hydrocarbon radical selected from the group consisting of aliphatic, alicyclic, aromatic and araliphatic, at least one dibasic acid of formula $HOOC - R^1 - COOH$ or a functional derivative thereof, said functional derivative being selected from the group consisting of acid halides, ester and salts which react in the same manner as acids, where R^1 is a divalent hydrocarbon radical selected from the group consisting of aliphatic, alicyclic, aromatic and araliphatic, and a monomer of formula A:

(A)



where *m* is an integer from 0 - 6, *n* is an integer from 1 - 6, R^2 is hydrogen or an alkyl group of 1 - 6 carbon atoms, R^3 is an alkyl, aryl, alkaryl, or alkenyl group of 1 - 12 carbon atoms, and Y and Z are independently selected from the group consisting of $- NH_2$, — COOH and functional derivatives thereof, said functional derivative being selected from the group consisting of acid halides, esters and salts which react in the same manner as acids, the monomer of formula A providing a unit of structure



in the backbone of the copolymer, the number of said units in the backbone chain being sufficient to provide from about 0.01 wt. % to about 3 wt. % of ketone carbonyl based upon the total copolymer.

4,042,569

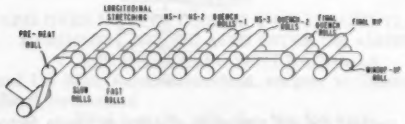
HEAT-SETTING PROCESS FOR POLYESTER FILM

Robert Glenn Bell, Florence, S.C.; Emile Gillyns, Sandweiler, Luxembourg, and Olin Kilpatrick McDaniel, Jr., Florence, S.C., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 494,981, Aug. 5, 1974, abandoned. This application Jan. 8, 1976, Ser. No. 647,492

Int. Cl.² C08G *63/12*; B29D *7/24*

U.S. Cl. 260—75 T **2 Claims**



1. In a process for production of an asymmetrically oriented, heat-set polyethylene terephthalale film, oriented more in the machine direction than in the transverse direction, the film having a machine direction tensile strength at 5% elongation (F5) of at least 20,000 psi (14.1 kg/mm²) and a machine direction shrinkage of not more than 2% at 105° C., by stretching the film in the transverse direction and in the machine direction, heat setting the biaxially oriented film in successive stages by contacting it in a first stage with a heat set roll at 150° to 210° C. and in a second stage with a roll at least 5° C. below the temperature of the first stage heat setting roll, but above the second order transition temperature, and thereafter contacting the film with a roll to quench it to below the second order transition temperature, the improvement comprising:

relaxing the film in the machine direction up to 2% between the first and second stage heat setting;

heat setting the film in a third stage following quenching by contacting it with a heat setting roll at the same temperature to 5° C. below the temperature of the second stage heat setting roll; then

quenching the film to less than 40° C. after the third stage heat setting by contacting with a second quench roll; and

relaxing the film in the machine direction from 0.5 to 6.5% between the third heat set roll and the second quench roll;

whereby a film having less than 0.7% shrinkage at 105° C. in the transverse direction and a reduced tear tendency is produced without significant loss of machine direction tensile strength at 5% elongation (F5) or increase in machine direction shrinkage.

4,042,570

TEREPHTHALIC ACID COPOLYESTERS WHICH CAN BE DYED IN THE ABSENCE OF CARRIERS

Claus-Rüdiger Bernert, Bomlitz, Cordingen; Eduard Radlmann, and Günther Nischk, both of Dormagen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 26, 1975, Ser. No. 607,945

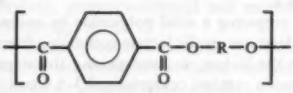
Claims priority, application Germany, Aug. 30, 1974, 2441537

Int. Cl.² C08G *63/18*

U.S. Cl. 260—75 M **7 Claims**

1. A high molecular weight linear terephthalic acid copolyester, which comprises recurring structural elements corresponding to the general formula (I):

(I)



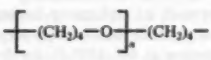
in which

R, in a proportion of from 95 to 99.99 mol %, represents a radical corresponding to the formula:

(II)

and R, in a proportion of from 0.01 to 5 mol %, represents a radical corresponding to the formula:

(III)



in which *n* is an integer from 5 to 70, the terephthalic acid copolyester having a relative solution viscosity η_{rel} of from 1.1 to 4.0 (as measured on a solution of 1.0 g of copolyester in 100 ml of o-chlorophenol at 25° C).

4,042,571

FIRE-RETARDANT POLYAMIDES FROM NAPHTHALENE DICARBOXYLIC REACTANT AND HALOGENATED CARBOXYLIC REACTANT

Shoji Kawase; Takeo Shima, and Keiichi Moriyama, all of Iwakuni, Japan, assignors to Teijin Limited, Osaka, Japan

Filed Aug. 7, 1974, Ser. No. 495,417

Claims priority, application Japan, Aug. 10, 1973, 48-89205; Aug. 27, 1973, 48-95115; July 18, 1974, 49-81677

Int. Cl.² C08G *69/26*

U.S. Cl. 260—78 R **10 Claims**

1. A film- or fiber-forming fire retardant polyamide consist-

ing essentially of the polymeric condensation product of (A) a carboxylic acid component consisting essentially of (1) at least one naphthalene dicarboxylic acid selected from the group consisting of naphthalen÷-2,7-dicarboxylic acid, naphthalene-2,6-dicarboxylic acid and its amide-forming derivative, and (2) at least one halogen-substituted dicarboxylic acid selected from the group consisting of a, halogen-substituted aliphatic di-carboxylic acid, halogen-substituted alicyclic dicarboxylic acid, and halogen-substituted carbocyclic aromatic dicarboxylic acid or their amide-forming derivatives these acids and derivatives being such that at least one hydrogen atom attached to a carbon atom in the dicarboxylic acid molecule is substituted by halogen atom and (B) an aliphatic diamine having 2 to 18 carbon atoms, the amount of said naphthalene dicarboxylic acid (1) being at least 70 mol% of the total acid component (A), and the amount of said halogen-substituted carboxylic acid being such that the halogen atom content of the polyamide is 1.0 to 10% by weight of the polyamide.

4,042,572

PREPARATION OF POLYAMIDES BY ANIONIC POLYMERIZATION WITH SUBSTITUTED TRIAZINE TRIONES AS COCATALYST

Zbynek Bukac, and Jan Sebenda, both of Prague, Czechoslovakia, assignors to Ceskoslovenska akademie ved, Prague, Czechoslovakia

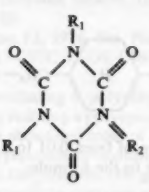
Continuation-in-part of Ser. No. 275,156, July 26, 1972, abandoned. This application Nov. 17, 1975, Ser. No. 632,210

Claims priority, application Czechoslovakia, July 27, 1971, 5479/71; July 27, 1971, 5480/71

Int. Cl.² C08G *69/18*

U.S. Cl. 260—78 L **9 Claims**

1. Method of preparing a solid polyamide by anionic polymerization of at least one cyclic lactam containing from 6 to 12 carbon atoms in the lactam ring comprising the steps of dissolving in a lactam a catalyst comprising 0.3–1.0 mol % of an alkali metal hydride or alkali metal salt of a lactam and 0.1–0.49 mol % of at least one cyclic co-catalyst and having the formula



wherein R_1 and R_2 are each an aryl group having 1 or 2 benzene rings, an alkoxyaryl, dialkylaminoaryl, alkylated aryl or arylated alkyl, and heating at 40°–175° C. for from 0.5 to 24 hours.

4,042,573

SULFONIC ACID DERIVATIVES AS PROMOTERS FOR THE POLYMERIZATION OF 2-PYRROLIDONE

Robert Bacskai, Kensington, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Aug. 25, 1975, Ser. No. 607,843

Int. Cl.² C08G *69/24*

U.S. Cl. 260—78 P **5 Claims**

1. A process for polymerizing 2-pyrrolidone to fiber-forming polypyrrolidone which comprises forming a mixture of 2-pyrrolidone, an alkaline polymerization catalyst, carbon dioxide polymerization activator, and trifluoromethane sulfonic acid anhydride polymerization promoter, and subjecting said mixture to a temperature of about 15°–100° C under substantially anhydrous conditions.

4,042,574

PURIFICATION OF TUBERCULOPROTEINS

Jacques Augier, and Solange Augier-Gibory, both of Paris, France, assignors to Institut Pasteur, Paris, France

Filed May 28, 1974, Ser. No. 473,475

Claims priority, application France, May 28, 1973, 73.19351

Int. Cl.² C07G *7/00*

U.S. Cl. 260—112 R **9 Claims**

1. A method of purification of tuberculoprotein C in which tuberculoprotein C is prepared by a precipitation of tuberculoproteins carried out in an acid medium in the presence of substances which break the hydrogen bonds, the formed precipitate is removed, the supernatant liquid is precipitated by acetone and then redissolved, filtration is carried out through a column of cellulose modified by chemical groups which introduce weakly basic functions and a tuberculoprotein C is precipitated by addition of trichloroacetic acid, wherein the improvements comprises purifying said tuberculoprotein C by subjecting an aqueous solution thereof in a neutral medium to the action of an ionized mineral or organic substance which does not affect the tuberculoprotein C or the solubility thereof to produce (1) a closely aggregated tuberculoprotein fraction and (2) a loosely and nonaggregated tuberculoprotein fraction; separating said two fractions from one another and recovering said second loosely and non-aggregated fraction.

4,042,575

EXTRACTION OF GLYCOPROTEINS AND SIALIC ACID FROM WHEY

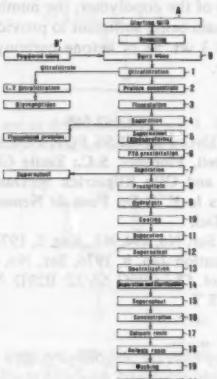
Jean-Marie Eustache, Martinvast, France, assignor to Union Cooperative Agricole Laitiere de la Manche, Sottevast, Brix, France

Filed Oct. 20, 1975, Ser. No. 624,305

Claims priority, application France, Oct. 22, 1974, 74.35495

Int. Cl.² A23J *1/20*; B01D *13/00*; C07G *7/00*

U.S. Cl. 260—112 R **34 Claims**



1. A method for the treatment of dairy or casein factory whey comprising the steps of:

a. ultrafiltering the whey through membranes having a cut-off of about 10,000 to about 50,000 in molecular weight, providing an ultrafiltrate comprising lactose, mineral salts and glycopeptides, and a retentate comprising proteins and sialic acid;

b. flocculating the proteins of said retentate providing a first protein precipitate and a first supernatent, which is separated and recovered;

c. treating the first supernatent with phosphotungstic acid under conditions capable of forming a second supernatent and a second protein precipitate, which is separated and recovered;

d. hydrolyzing the second precipitate, providing a third precipitate and a third supernatent, which is separated and recovered;

e. extracting sialic acid from said third supernatent.

4,042,576

EXTRACTION OF GLYCOPROTEINS AND SIALIC ACID FROM WHEY

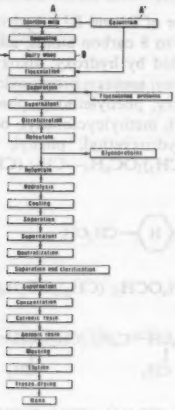
Jean-Marie Eustache, Sideville, Martinvast, France, assignor to Union Cooperative Agricole Laitiere de la Manche, Sottevast, Brix, France

Filed Oct. 20, 1975, Ser. No. 624,306

Claims priority, application France, Oct. 22, 1974, 74.35496

Int. Cl.[2] A23J *1/20;* **B01D** *13/00;* **C07G** *7/00*

U.S. Cl. 260—112 R **28 Claims**



1. A process for separating glycoproteins and/or sialic acid from whey comprising the steps of:

a. flocculating the whey proteins, other than the sialoglycoproteins, providing a first precipitate of flocculated proteins and a first supernatent, which is separated and recovered;

b. ultrafiltrating the first supernatent on membranes having a cut-off of between about 1000 and about 15,000 in molecular weight, providing a retentate containing glycoproteins and sialic acid;

c. hydrolyzing said retentate;

d. treating said hydrolysate to extract the sialic acid therefrom.

4,042,577

AZO DYES HAVING ONE OR TWO TRIAZINYL-OR PYRIMIDYL-ACETIC ACID ESTER OR AMIDE COUPLING COMPONENT RADICALS

Bansi Lal Kaul, Basel, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

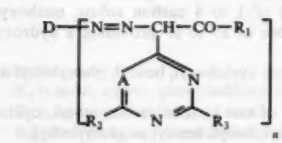
Filed Sept. 30, 1974, Ser. No. 510,476

Claims priority, application Switzerland, Oct. 5, 1973, 14255/73

Int. Cl.[2] C09B *29/36, 35/18;* **D06P** *1/04*

U.S. Cl. 260—153 **29 Claims**

1. A compounds of the formula



wherein

D is phenyl, substituted phenyl, naphthyl, substituted naphthyl, quinolyl, substituted quinolyl, benzimidazolonyl, substituted benzimidazolonyl, quinoxalyl, substituted quinoxalyl, anthraquinonyl or substituted anthraquinonyl when *n* is 1, wherein any substituted phenyl, substituted naphthyl, substituted quinolyl, substituted benzimidazolonyl, substituted quinoxalyl or substituted anthraquinonyl has 1 to 3 substituents each of which is independently fluoro, chloro, bromo, C_{1-8}alkyl, C_{1-8}alkoxy, cyano, nitro, (C_{1-8}alkoxy)carbonyl, C_{1-8}alkylsulfonyl, trifluoromethyl, carbamoyl, sulfamoyl, (C_{1-8}alkyl)carbamoyl, C_{1-8}alkylsulfamoyl, di-(C_{1-8}alkyl)carbamoyl, di-(C_{1-8}alkyl)sulfamoyl, phenylcarbamoyl, (monosubstituted phenyl)carbamoyl, guanidinosulfonyl, benzamido, (monosubstituted phenyl)-carbonylamino, phenylazo, monosubstituted phenylazo, phenoxycarbonyl or monosubstituted phenoxycarbonyl, wherein the substitutent of any (monosubstituted phenyl)-carbomoyl, (monosubstituted phenyl)carbonylamino, monosubstituted phenylazo or monosubstituted phenoxycarbonyl is chloro, bromo, C_{1-8}alkyl, trifluoromethyl, cyano, nitro, carbamoyl, (C_{1-8}-alkoxy)carbonyl or (C_{1-4}alkyl)carbamoyl, with the proviso that the maximum number of each substituent selected from the group consisting of cyano, nitro, (C_{1-8}alkoxy)carbonyl and C_{1-8}-alkylsulphonyl is two and the maximum number of each substituent selected from the group consisting of trifluoromethyl, carbamoyl, sulfamoyl, (C_{1-8}alkyl)carbamoyl, C_{1-8}alkylsulfamoyl, di-(C_{1-8}alkyl)carbamoyl, di-(C_{1-8}alkyl)-sulfamoyl, phenylcarbamoyl, (monosubstituted phenyl)-carbamoyl, guanidinosulfonyl, benzamido, (monosubstituted phenyl)carbonylamino, phenylazo, monosubstituted phenylazo, phenoxycarbonyl and monosubstituted phenoxycarbonyl is one, or

D is 4,4'-diphenylene substituted by 1–4 substituents each of which is independently chloro, bromo, nitro, cyano, methyl or C_{1-8}alkoxy when *n* is 2,

R_1 is $—NH_2$, $—NHR_4$ or $—OR_4$,

wherein R_4 is C_{1-8}alkyl, C_{5-8}-cycloalkyl, phenyl, substituted phenyl, naphthyl, substituted naphthyl, phthalimidyl, substituted phthalimidyl, phthalazinyl, substituted phthalizinyl, quinazolonyl, substituted quinazolonyl, quinoxalinyl, substituted quinoxalinyl, quinoxaline-2,3substituted quinoxaline-2,3-dion-yl, benzimidazolonyl, substituted benzimidazolonyl, pyridyl, substituted pyridyl, thienyl, substituted thienyl, 2-thiazolyl or substituted 2-thiazolyl,

wherein any substituted phenyl, substituted naphthyl, substituted phthalimidyl, substituted phthalizinyl, substituted quinaolonyl, substituted quinoxalinyl, substituted quinoxaline-2,3-dion-yl, substituted benzimidazolonyl, substituted pyridyl, substituted thienyl or substituted 2-thiazolyl has 1–3 substituents each of which is independently chloro, bromo, C_{1-8}alkyl, C_{1-8}alkoxy, trifluoromethyl, guanidinosulfonyl, nitro, cyano, $—CO—NH—R_5$ or $—SO_2—NH—R_5$,

with the proviso that the maximum number of each substituent selected from the group consisting of chloro, bromo, C_{1-8}alkyl and C_{1-8}alkoxy is two and the maximum number of each substituent selected from the group consisting of trifluoromethyl, guanidinosulfonyl, nitro, cyano, $—CO—NH—R_5$ and $—SO_2NH—R_5$ is one,

wherein R_5 is C_{1-8}alkyl, C_{5-8}cycloalkyl, phenyl, substituted phenyl, naphthyl or substituted naphthyl, wherein any substituted phenyl or substituted naphthyl has 1–3 substituents each of which is independently halo, C_{1-8}-alkyl, C_{1-8}alkoxy, trifluoromethyl, nitro, cyano, phenylcarbamoyl or phenylsulfamoyl, with the proviso that the maximum number of each substituent selected from the group consisting of halo, C_{1-8}alkyl and C_{1-8}alkoxy is two and the maximum number of each substituent selected

from the group consisting of trifluoromethyl, nitro, cyano, phenylcarbamoyl, and phenylsulfamoyl is one,

each of R_2 and R_3 is independently hydrogen, hydroxy, C_{1-8}alkoxy, amino, C_{5-8}cycloalkylamino, C_{1-8}alkylamino, di-(C_{1-8}alkyl)amino, phenylamino, naphthylamino or N-phenyl-N-C_{1-8}alkylamino,

A is N or R_6—C,

wherein R_6 is hydrogen, halo or C_{1-8}-alkyl, and

n is 1 or 2,

wherein each halo is independently fluoro, chloro or bromo.

4,042,578

AZO DYES HAVING 2,6-DIAMINOPYRIDINE DERIVATIVES AS COUPLING COMPONENTS

Johannes Dehnert, and Gunther Lamm, both of Ludwigshafen, Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Mar. 7, 1973, Ser. No. 338,859

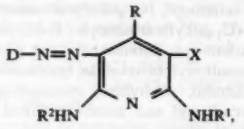
Claims priority, application Germany, Mar. 10, 1972, 2211663; June 2, 1972, 2226933; Oct. 21, 1972, 2251702; Dec. 2, 1972, 2259103; Dec. 1, 1972, 2258823; Dec. 6, 1972, 2259684

The portion of the term of this patent subsequent to Dec. 21, 1993, has been disclaimed.

Int. Cl.[2] C09B 29/36

U.S. Cl. 260—156 **8 Claims**

1. A dye of the formula



wherein:

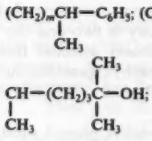
D is phenyl substituted by chlorine, bromine, trifluoromethyl, methyl, methoxy, nitro, cyano, methylsulfonyl, phenylsulfonyl, carbalkoxy of a total of 2 to 5 carbon atoms, carbo-β-alkoxy-ethoxy, said alkoxy having 1 to 4 carbon atoms, or N,N-dialkyl- or N-monoalkyl-substituted sulfamoyl, each alkyl having 1 to 4 carbon atoms; phenylazophenyl; phenylazophenyl substituted by methyl, chlorine, bromine or nitro; benzthiazolyl; benzthiazolyl substituted by nitro, cyano, methylsulfonyl or ethylsulfonyl; benzisothiazolyl substituted by chlorine, bromine, cyano or nitro; thiazolyl substituted by cyano or nitro; thienyl substituted by methyl, cyano, nitro or carbalkoxy of a total of 2 to 5 carbon atoms; or thiadiazolyl substituted by phenyl, methyl, chlorine, bromine, methylmercapto, ethylmercapto or alkoxycarbonylethylmercapto, said alkoxy having 1 to 4 carbon atoms;

R is alkyl of 1 to 3 carbon atoms;

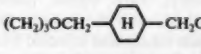
X is carbamoyl or cyano;

R^1 and

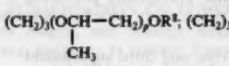
R^2 may be the same or different with the proviso that one of R^1 and R^2 is C_6H_5;



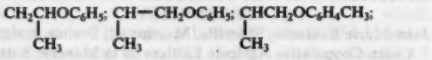
$(CH_2)_3OCH_2CH_2OH$; $(CH_2)_3O(CH_2)_6OH$;

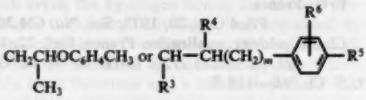


$(CH_2)_3OC_2H_4OR^7$, $(CH_2)_3(OC_2H_4)_qOR^8$, $(CH_2)_3OR^9$;



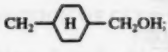
$C_2H_4OC_6H_5$, $C_2H_4OC_6H_4CH_3$;



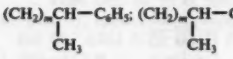


and the other of R^1 and R^2 is hydrogen;

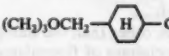
alkyl of 1 to 8 carbon atoms; alkyl of 2 to 8 carbon atoms substituted by hydroxy, alkoxy of 1 to 8 carbon atoms, formyloxy, acetoxy, propionyloxy, carboxy, cyclohexoxy, benzyloxy, phenylethoxy, phenoxy or pyrrolidonyl; cyclohexyl; methylcyclohexyl; benzyl; phenylethyl; β-phenyl-β-hydroxyethyl; phenyl; tolyl; $CH_2CH_2OCH_2CH_2OH$; $(CH_2)_3OC_6H_5$—CH_3; $(CH_2)_3O(CH_2)_4OH$;



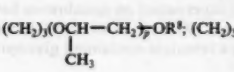
$(CH_2)_3OC_2H_4OCH_3$; $(CH_2)_3OC_2H_4OC_6H_5$;



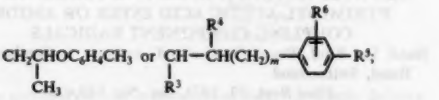
$(CH_2)_3OCH_2CH_2OH$; $(CH_2)_3O(CH_2)_6OH$;



$(CH_2)_3OC_2H_4OR^7$; $(CH_2)_3(OC_2H_4)_qOR^8$;



$C_2H_4OC_6H_4CH_3$;



R^3 is alkyl of one to three carbon atoms, hydroxymethyl or hydroxyethyl;

R^4 is hydrogen, alkyl of one to three carbon atoms, hydroxymethyl or hydroxyethyl;

R^5 is hydrogen or hydroxyl;

R^6 is hydrogen, alkyl of 1 to 4 carbon atoms, methoxy, ethoxy or chloro; one of R^3 to R^5 providing a hydroxy group;

R^7 is ethyl, propyl, butyl, cyclohexyl, benzyl, phenylethyl or methylphenyl;

R^8 is hydrogen, alkyl of one to four carbon atoms, cyclohexyl, phenyl, methylphenyl, benzyl or phenylethyl;

R^9 is cyclohexyl, phenyl, methylphenyl, benzyl or phenylethyl;
m is 1 or 2;
n is zero, 1 or 2;
q is 2, 3 or 4; and
p is 1, 2, 3 or 4.

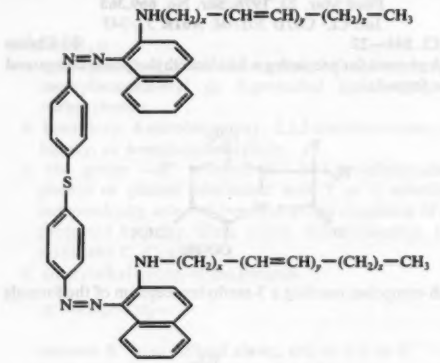
4,042,579

LIQUID DISAZO DYESTUFFS DERIVED FROM DIPHENYLSULPHIDE

Aimé Joseph Arsac, Condrieu, and Pierre Frank, Saint Clair du Rhone, both of France, assignors to Produits Chimiques Ugine Kuhlmann, Paris, France

Filed June 10, 1975, Ser. No. 585,545
Claims priority, application France, June 28, 1974, 74.22596
Int. Cl.² C09B *35/24, 35/22;* D06P *1/08*
U.S. Cl. 260—178 **9 Claims**

1. Liquid dyestuff of the formula:



in which y represents 0 or 1, x and z each represent a whole number in which the sum $x + y + z$ is a whole number from 5 to 17.

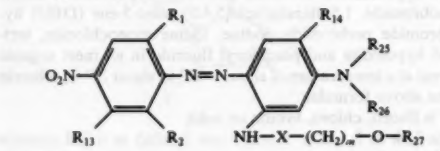
4,042,580

PHENYLAZOPHENYL DYES HAVING AN ALKOXYACYLAMINO GROUP ON THE COUPLING COMPONENT RADICAL

Wolfgang Groebke, Oberwil, Basel-Land, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Continuation of Ser. No. 337,273, March 1, 1973, abandoned, which is a continuation-in-part of Ser. No. 138,813, April 29, 1971, abandoned. This application Mar. 3, 1975, Ser. No. 554,547
Claims priority, application Switzerland, May 6, 1970, 6808/70; Dec. 29, 1970, 19249/70
Int. Cl.² C09B *29/08, 43/18, 29/26*
U.S. Cl. 260—207 **19 Claims**

1. A compound of the formula



wherein
R_1 is nitro, cyano, phenylsulfonyl or tolylsulfonyl,
R_2 is hydrogen, chloro or bromo,
R_{13} is hydrogen, formamido, acetamido, propionamido, chloropropionamido or bromopropionamido, with the proviso that at least one of R_2 and R_{13} is hydrogen,
R_{14} is hydrogen, methoxy or ethoxy,
R_{25} is alkyl, cyanoalkyl, formyloxyalkyl, alkylcarbonyloxyalkyl, alkoxycarbonyloxyalkyl or alkoxycarbonylalkyl,
R_{26} is alkyl, hydroxyalkyl, formyloxyalkyl, alkylcarbonyloxyalkyl, alkoxycarbonyloxyalkyl or alkoxycarbonylalkyl,
R_{27} is alkoxyalkyl,
X is —CO—, —CO_2— or —SO_2—, and
m is 2 or 3,
wherein each alkyl, hydroxyalkyl and alkyl and alkoxy radical of each cyanoalkyl, formyloxyalkyl, alkylcarbonyloxyalkyl, alkoxycarbonyloxyalkyl, alkoxycarbonylalkyl and alkoxyalkyl independently has 1 to 4 carbon atoms

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4,042,581

NICOTINIC DERIVATIVES OF ESTRIOL

Nicolas Gueritee, 65, rue des Vignes, 75016 Paris, France

Filed Feb. 19, 1975, Ser. No. 551,151
Int. Cl.² C07J *41/00, 43/00*
U.S. Cl. 260—239.5 **5 Claims**

1. The compound 3-methoxy-16α, 17β-dinicotinoyloxy-1,3,5(10)-estratriene.

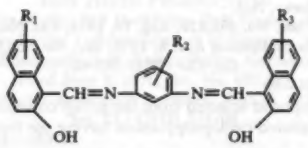
4,042,582

MIXTURES OF DISAZOMETHINE AND MONOAZO METHINE COMPOUNDS, PROCESS FOR THEIR PREPARATION AND THEIR USE AS PIGMENTS

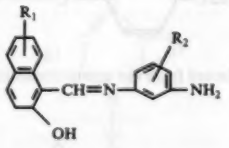
Theodor Papenfuhs, Frankfurt am Main, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Mar. 25, 1975, Ser. No. 561,935
Claims priority, application Germany, Mar. 30, 1974, 2415550
Int. Cl.² C07C *119/00*
U.S. Cl. 106—288 Q **11 Claims**

1. A mixture in a molar ratio of 2:1 to 1:3 of water-insoluble azomethine compounds comprising a compound of the formula (Ia)



and of the formula (Ib)



wherein R_1, R_2 and R_3 are the same or different and each is hydrogen, halogen, lower alkyl, lower alkoxy, cyano, nitro, lower alkylsulfone, phenylsulfone, lower carboalkoxy, sulfonic acid amide, carboxylic acid amide, sulfonic acid mono-(lower alkyl)-amide, sulfonic acid di-(lower alkyl)-amide, carboxylic acid mono-(lower alkyl)-amide or carboxylic acid di-(lower alkyl)-amide.

4,042,583

IMIDAZO[2,1-B]THIAZOLE AND THIAZOLO[3,2-a]-BENZIMIDAZOLE QUATERNARY SALTS AS HYPOGLYCEMIC AGENTS AND GROWTH PROMOTANTS

Richard M. Acheson, Oxford; John K. Stubbs, Deal; Charles A. R. Baxter, Sandwich, all of England, and Donald E. Kuhla, Gales Ferry, Conn., assignors to Pfizer Inc., New York, N.Y.

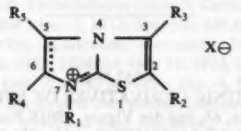
Division of Ser. No. 594,109, July 8, 1975, Pat. No. 4,008,245, which is a division of Ser. No. 507,384, Sept. 19, 1974, Pat. No. 3,954,784. This application June 9, 1976, Ser. No. 694,247

Claims priority, application United Kingdom, Sept. 20, 1973, 44199/73

Int. Cl.[2] C07D *513/04*

U.S. Cl. 542—458 **2 Claims**

1. A compound of the formula



wherein

X is a pharmaceutically acceptable anion;

R_1 is styryl;

R_2 is selected from the group consisting of hydrogen and alkyl having from 1 to 3 carbon atoms;

R_3 is selected from the group consisting of hydrogen, alkyl having from 1 to 3 carbon atoms, adamantyl, phenyl and substituted phenyl wherein said substitutent is selected from the group consisting of dimethyl and dimethoxy;

R_2 and R_3 when taken together are tetramethylene;

R_4 is selected from the group consisting of hydrogen, alkyl having from 1 to 3 carbon atoms, phenyl, dimethylphenyl, and chlorophenyl and

R_5 is hydrogen.

4,042,584

ETHYNYLARYL PHENYL CYCLOPROPYL THIAZINES AND MORPHOLINES

David C. Remy, North Wales, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

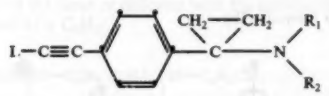
Division of Ser. No. 498,829, Aug. 19, 1974, Pat. No. 3,903,165. This application Apr. 8, 1975, Ser. No. 566,584

Int. Cl.[2] C07D *295/02*

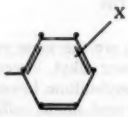
U.S. Cl. 544—59 **6 Claims**

1. A compound selected from the group consisting of

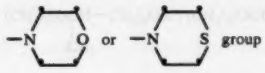
a. a substituted cyclopropylamine having the formula



wherein L is selected from the group consisting of phenyl and



wherein X is Cl, Br, I, F, $-CF_3$, $-C_1$-C_4alkyl, $-C_1$-C_4 alkoxy or phenyl and R_1 and R_2 are joined forming a



and

b. a non-toxic, pharmaceutically acceptable salt of (a).

4,042,585

PROCESS FOR PREPARATION OF 3-HALOMETHYLCEPHEMS

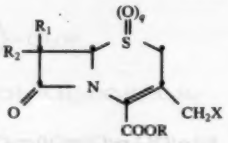
Gary A. Koppel, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Mar. 22, 1976, Ser. No. 669,365

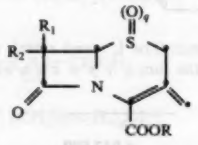
Int. Cl.[2] C07D *501/04*; A61K *31/545*

U.S. Cl. 544—22 **31 Claims**

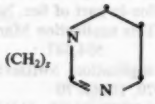
1. A process for preparing a 3-halomethylcephem compound of the formula



which comprises reacting a 3-methylenecepham of the formula



with from about 3 to about 6 equivalents of an alkali metal salt of a secondary C_1-C_7 alcohol or with from about 1 to about 3 equivalents of an alkali metal salt of a primary or tertiary C_1-C_7 alcohol or a bicyclic amidine base of the formula



in the presence of about 1 to about 6 equivalents of a positive halogenating agent selected from the group consisting of tert-butyl hypochlorite, bromine, tert-butyl hypobromite, idoine monobromide, 1,5-diazabicyclo[5.4.0]undec-5-ene (DBU) hydrobromide perbromide, iodine, iodine monochloride, tert-butyl hypoiodite and perchloryl fluoride in an inert organic solvent at a temperature of about $-80°$ to about 20° C. wherein in the above formulae

X is fluoro, chloro, bromo or iodo;

z is 3, 4, or 5;

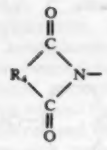
q is 1 or 0;

R is a carboxylic acid protecting group;

R_1 is hydrogen or methoxy;

R_2 is

1. an imido group of the formula



wherein R_4 is C_2-C_4 alkenylene, 1,2-phenylene, or 1,2-cyclohexenylene;

2. an amido group of the formula

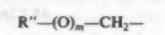
wherein R_3 is

a. hydrogen, C_1-C_3 alkyl, halomethyl, 3-(2-chlorophenyl)-5-methylisoxazol-4-yl or 4-protected amino-4-protected carboxybutyl;

b. benzyloxy, 4-nitrobenzyloxy, 2,2,2-trichloroethoxy, tert-butoxy, or 4-methoxybenzyloxy;

c. the group —R″ wherein R″ is 1,4-cyclohexadienyl, phenyl or phenyl substituted with 1 or 2 substituents independently selected from the group consisting of halo, protected hydroxy, nitro, cyano, trifluoromethyl, C_1-C_3 alkyl, and C_1-C_7 alkoxy;

d. an arylalkyl group of the formula

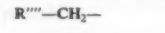


wherein R″ is as defined above, and *m* is 0 or 1;

e. a substituted arylalkyl group of the formula

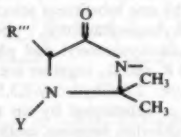
wherein R‴ is R″ as defined above, 2-thienyl or 3-thienyl, and W is protected hydroxy or protected amino; or

f. a heteroarylmethyl group of the formula



wherein R⁗ is 2-thienyl, 3-thienyl, 2-furyl, 2-thiazolyl, 5-tetrazolyl, 1-tetrazolyl; or R_2 is

3. an imidazolidinyl group of the formula



wherein R‴ is as defined above and Y is acetyl or nitroso; with the limitations that when a C_1-C_7 primary alkoxide base is employed in conjunction with tert-butyl hypochlorite, R_1 is methoxy; and when a brominating agent is employed and R‴ or R⁗ is 2-thienyl, 3-thienyl or 2-furyl, additionally, a halogen quenching agent is added to the reaction mixture.

4,042,586

2-(3-SUBSTITUTED AMINO-2-HYDROXYPROPOXY)-3-SUBSTITUTED PYRAZINES

Burton Kendall Wasson, Valois, Canada, and Leonard M. Weinstock, Belle Mead, N.J., assignors to Merck Sharp & Dohme (I.A.) Corporation, Rahway, N.J.

Division of Ser. No. 408,032, Oct. 19, 1973, Pat. No. 3,946,009, which is a continuation-in-part of Ser. No. 341,421, March 15, 1973, abandoned. This application June 6, 1975, Ser. No. 584,439

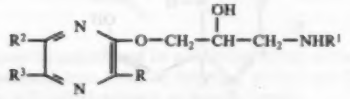
Claims priority, application Canada, May 5, 1972, 141471

Int. Cl.² C07D *417/04*

U.S. Cl. 544—60 **9 Claims**

1. A pyrazine compound having the structure

I



or a pharmacologically acceptable salt thereof wherein R represents morpholino or thiomorpholino;

R^1 represents a straight or branched chain C_{3-6} alkyl, a straight or branched chain hydroxy substituted C_{3-6}alkyl, a straight or branched chain C_{3-6}alkinyl, phenyl-C_{1-6}alkyl or iodolyl-C_{1-6}alkyl;

R^2 and R^3 can represent the same or different substituents and represent hydrogen, C_{1-3}alkyl, C_{5-7}cycloalkyl, C_{1-3}alkoxy, phenoxy, phenyl, substituted phenyl wherein the substituent is C_{1-3}alkyl, C_{1-3}alkoxy, amino, acetylamino, nitro or halo; or morpholino or thiomorpholino.

4,042,587

1,2,4-DIHYDROTRIAZINE-4-OXIDES AND A PROCESS FOR THEIR PRODUCTION

Hans-Martin Weitz, Bad Durkheim; Rolf Fischer, Heidelberg, and Dieter Lenke, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed June 1, 1976, Ser. No. 691,225

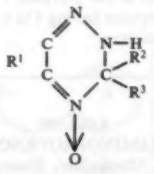
Claims priority, application Germany, June 20, 1975, 2527490

Int. Cl.² C07D *253/08*

U.S. Cl. 544—183 **7 Claims**

1. 1,2,4-Dihydrotriazine-4-oxides of the formula

I,



wherein R^1 is an alkylene of 2 to 10 carbon atoms, R^2 and R^3 are identical or different and each is alkyl of 1 to 8 carbon atoms cycloalkyl of 5 to 8 carbon atoms, aralkyl of 7 to 12 carbon atoms or phenyl or R^2 and R^3 together with the adjacent carbon are members of a 5-membered to 13 membered alicyclic ring.

4,042,588

MANUFACTURE OF 1,2,4-DIHYDROTRIAZINE-4-OXIDE-SPIRO-(3,1')-[OXIMINO-(2')-CYCLOALKANES]

Hans-Martin Weitz, Bad Duerkheim; Rolf Fischer, Heidelberg, and Dieter Lenke, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed June 1, 1976, Ser. No. 691,226

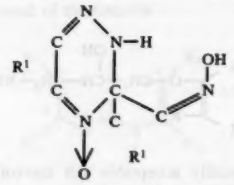
Claims priority, application Germany, June 25, 1975, 2528285

Int. Cl.[2] C07D *253/08*

U.S. Cl. 544—183 **7 Claims**

1. 1,2,4-Dihydrotriazine-4-oxide-spiro-(3,1')-[oximino-(2')-cycloalkanes] of the formula

I,



where R^1 is an alkylene of 2 to 10 carbon atoms.

4,042,589

PTERIDINE COMPOUNDS

Hamish Christopher Swan Wood, Bearsden, Scotland, and Kyuji Ohta, Tokyo, Japan, assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Division of Ser. No. 383,699, July 30, 1973, Pat. No. 3,933,820. This application Oct. 14, 1975, Ser. No. 621,661

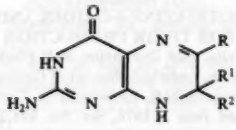
Claims priority, application United Kingdom, Aug. 1, 1972, 35816/72; Feb. 1, 1973, 5190/73

Int. Cl.[2] C07D *475/04*

U.S. Cl. 260—251.5 **16 Claims**

1. A compound of formula (I), or a tautomeric form thereof,

(I)



wherein R is a phenoxyloweralkyl group or phenoxyloweralkyl which is substituted by one or more loweralkoxy, loweralkyl, amino, hydroxyl or halogen and R^1 and R^2 are the same or different and each is a lower alkyl group or R^1 and R^2, together with the carbon atom in the pteridine ring structure, form a spriocycloalkyl ring system having 4 to 6 carbon atoms outside the pteridine ring structure.

4,042,590

DIAMINOPROPANOLS

Robert R. Jacquier, Montpellier, France, assignor to Centre d'Etudes Pour l'Industrie Pharmaceutique, Toulouse, France

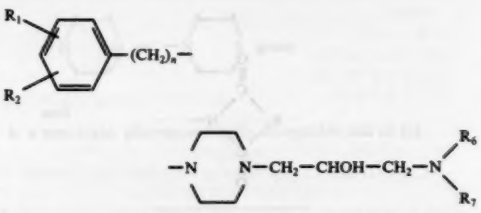
Continuation-in-part of Ser. No. 490,495, July 22, 1974, Pat. No. 3,957,789. This application Jan. 19, 1976, Ser. No. 650,194

Claims priority, application France, July 24, 1973, 73.27016

Int. Cl.[2] C07D *295/08, 401/12, 403/12*

U.S. Cl. 260—268 R **7 Claims**

1. A compound of the formula:



wherein R_1 and R_2 are hydrogen, fluorine, chlorine, methyl, methoxy, trifluoromethyl or, where taken together, represent a methylenedioxy group, and

represents piperidino or azepino, N is zero or one, or the pharmaceutically acceptable acid addition and quaternary ammonium salts thereof.

4,042,591

NAPHTHOQUINONE COMPOUNDS

Bansi Lal Kaul, Basel, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

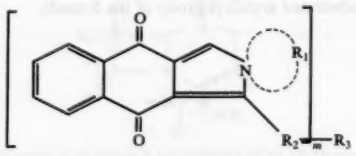
Filed May 23, 1974, Ser. No. 472,853

Claims priority, application Switzerland, May 30, 1973, 7813/73; June 15, 1973, 8715/73

Int. Cl.[2] C07D *471/04*

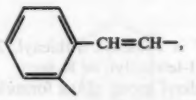
U.S. Cl. 260—272 **48 Claims**

1. A compound of formula I,



in which

R_1 is a group —CH=CH—CH=CH— or



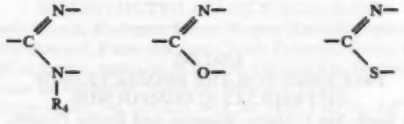
which group is unsubstituted or substituted by up to two substituents selected from chlorine bromine, methyl and C_{1-4}alkoxy or by one substituent selected from aminocarbonyl, C_{1-4}alkylaminocarbonyl, phenylaminocarbonyl, carboxyl, C_{1-4}alkoxycarbonyl and phenoxycarbonyl, either *m* is 1 and R_2 and R_3, together are cyano; 2- or 4-pyridyl; 2-quinolyl; 2,4-dihydroxy-1,3,5-triazinyl; phenyl, unsubstituted or substituted by up to two substituents selected from chlorine, bromine, methyl, C_{1-4}alkoxy, nitro and cyano; or —CO—R_5, where

R_5 is hydroxy, methyl, C_{1-4}alkoxy, phenyl or phenoxy, which phenyl or phenoxy is unsubstituted or substituted by up to two substituents selected from chlorine, bromine, methyl, nitro and cyano, provided that only one cyano is borne thereby, or

m is 1, R_2 is —CO—NR_4—, in which R_4 is hydrogen or

C_{1-4}alkyl, and R_3 is hydrogen; C_{1-4}alkyl; carbazolyl; thiazole anthronyl; anthraquinonyl which is unsubstituted or substituted by up to two substituents selected from chlorine, bromine, methyl, C_{1-4}alkoxy, amino, hydroxy, phenylamino, phenylmercapto, nitro, benzoylamino, mono- or dichloro- benzoylamino, mono- or dibromobenzoylamino and nitrobenzoylamino; pyridyl; naphthyl; benzimidazolonyl; phenyl, unsubstituted or substituted by up to three substituents selected from up to three substituents selected from chlorine and bromine, up to two substituents selected from nitro, methyl and C_{1-4} alkoxy and one substituent selected from benzoylamino, mono- or dichlorobenzoylamino, mono- or dibromobenzoylamino, nitrobenzoylamino, C_{1-4}alkylcarbonylaminobenzoylamino, aminocarbonyl, C_{1-4}alkylaminocarbonyl, phenylaminocarbonyl, mono-, di- or trichlorophenylaminocarbonyl, mono-, di- or tribromophenylaminocarbonyl, C_{1-4}alkylcarbonylaminophenylaminocarbonyl and C_{1-4}alkoxycarbonyl, or

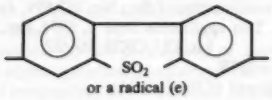
m is 1, R_2 is a radical (a), (b) or (c)



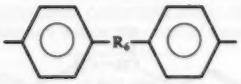
(a) (b) (c)

in which R_4 is as defined above, and

R_3 is C_{1-4}alkylene; divalent pyridyl; divalent naphthyl; divalent benzimidazolonyl; divalent benzene, unsubstituted or substituted by up to two substituents selected from chlorine, bromine, methyl, C_{1-4}alkoxy and nitro; any aromatic radical as R_3 is bound to R_2 through adjacent carbon atoms; or *m* is 2, R_2 is $—CONR_4—$, where R_4 is as defined above, and R_3 is C_{1-4}alkylene; divalent anthraquinonyl, unsubstituted or substituted by up to two substituents selected from chlorine, bromine, methyl, C_{1-4}alkoxy, amino, hydroxy, phenylamino, phenylmercapto, nitro, benzoylamino, mono- or di-chlorobenzoylamino, mono- or di-bromobenzoylamino and nitrobenzoylamino; divalent pyridyl; divalent napththyl; divalent benzimidazolonyl; divalent benzene, unsubstituted or substituted by up to two substituents selected from chlorine, bromine, methyl, C_{1-4}alkoxy and nitro; divalent diphenyl, unsubstituted or substituted by up to two substitutents selected from chlorine, bromine, methyl, C_{1-4}alkoxy and nitro; a radical (d)



or a radical (e)

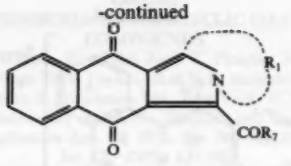


in which

R_6 is $—S—$, $—SO_2—$ or $—NH—CO—$ or;

m is 2, R_2 is a radical (a), (b) of (c), above, and R_3 is an unsubstituted tetravalent diphenyl radical, the links between such radical and radicals (a), (b) or (c) being through adjacent carbon atoms.

47. A compound of formula Ic

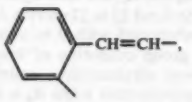


Ic

-continued

in which

R_1' is a group $—CH=CH—CH=CH—$ or



which group isunsubstituted or substituted by up to two substituents selected from chlorine, bromine, methyl and C_{1-4}alkoxy, or by a C_{1-4}alkylcarbonyl or benzoyl group,

R_7 is a hydroxyl, C_{1-4}alkoxy or phenoxy group.

4,042,592

NOVEL DIBENZO[a,g]QUINOLIZINIUM COMPOUNDS

Yoshio Sawa, Nishinomiya, Japan, assignor to Kanebo, Ltd., Tokyo, Japan

Filed May 1, 1975, Ser. No. 573,786

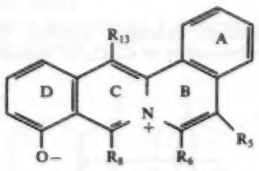
Claims priority, application Japan, May 8, 1974, 49-51459; May 8, 1974, 49-51460; May 9, 1974, 49-51804; May 9, 1974, 49-51805; May 9, 1974, 49-51806; May 11, 1974, 49-52575; May 11, 1974, 49-52576; May 11, 1974, 49-52577; May 11, 1974, 49-52578; May 11, 1974, 49-52579; May 14, 1974, 49-54008; May 14, 1974, 49-54009; May 14, 1974, 49-54010; May 14, 1974, 49-54011; May 14, 1974, 49-54012

Int. Cl.[2] C07D *215/10*

U.S. Cl. 260—286 Q 16 Claims

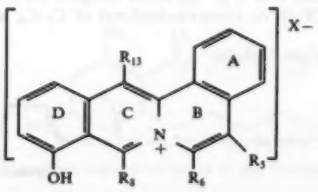
1. A dibenzo(a,g) quinolizinium compound selected from the group consisting of a betaine of the formula:

I



; an anionide of the formula:

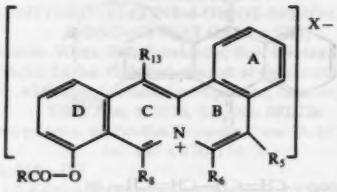
II



; and an O-acylate of the formula:

III

-continued



wherein R_5, R_6, R_8 and R_{13} are each hydrogen atom or lower alkyl; positions 1 to 4 and 10 to 12 on ring A and ring D respectively are each substituted with 0 to several substituents selected from the group consisting of lower alkyl, hydroxy, lower alkoxy, lower alkylenedioxy, amino and lower alkylamino; with the proviso that when R_8 is hydrogen atom and ring D is substituted only at position 10 with alkoxy, ring A cannot be substituted only at positions 2 and 3 with alkoxy or alkylenedioxy; X is a pharmaceutically acceptable anion; and RCO is an acyl group derived from an aliphatic or araliphatic carboxylic acid.

4,042,593

1H-IMIDAZOL(4,5-B)PYRIDINE DERIVATIVES

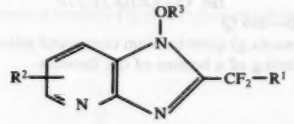
George O. P. O'Doherty, Greenfield, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Division of Ser. No. 615,312, Sept. 22, 1975, Pat. No. 4,000,145, which is a division of Ser. No. 447,116, March 1, 1974, Pat. No. 3,932,428, which is a division of Ser. No. 236,195, March 20, 1972, Pat. No. 3,818,022, which is a continuation-in-part of Ser. No. 181,638, Sept. 17, 1971, abandoned, which is a continuation-in-part of Ser. No. 100,410, Dec. 21, 1970, abandoned. This application Sept. 23, 1976, Ser. No. 725,818

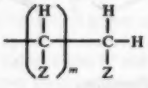
Int. Cl.[2] C07D *471/04*

U.S. Cl. 260—294.8 C **2 Claims**

1. A compound of the formula

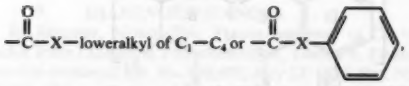


wherein R^1 represents hydrogen, chlorine, fluorine, difluoromethyl, perfluoroalkyl of C_1–C_6, or radical of the formula:



wherein each Z independently represents hydrogen or halogen and m represents 0 or 1; R^2 represents halogen, nitro, $—CF_3$, $—CF_2Cl$, $—CF_2H$, or loweralkylsulfonyl of C_1–C_4; and R^3 represents

1. radical of the formulae



wherein X is oxygen or sulfur; or

2. $—SO_2—R^7$ wherein R^7 is loweralkyl as above defined, cycloalkyl of C_5–C_6, phenyl, substituted phenyl or benzyl, wherein substituted phenyl is a phenyl radical bearing from 1–3 substituents, each of which is independently amino, nitro, chloro, methyl, or methoxy.

4,042,594

THE HYPOLIPIDEMIC AGENT, 4-(4-CHLOROBENZYLOXY)-BENZYL NICOTINATE AND PREPARATION THEREOF

Tsutomu Irikura, Tokyo, Japan, assignor to Kyorin Pharmaceutical Co., Ltd., Tokyo, Japan

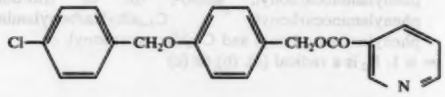
Filed June 30, 1976, Ser. No. 701,015

Claims priority, application Japan, Nov. 8, 1975, 50-134445

Int. Cl.[2] C07D *213/55*

U.S. Cl. 260—295.5 R **2 Claims**

1. 4-(4'-Chlorobenzyloxy)benzyl nicotinate having the following formula:



4,042,595

PROCESSES FOR THE PRODUCTION OF HETEROCYCLIC COMPOUNDS

Paolo Koch, San Giuliano Milanese, and Emilio Perrotti, San Donato Milanese, both of Italy, assignors to Snam Progetti S.p.A., San Donato Milanese, Italy

Continuation of Ser. No. 491,863, July 25, 1974, abandoned. This application Feb. 4, 1976, Ser. No. 655,052

Claims priority, application Italy, Aug. 1, 1973, 27389/73

Int. Cl.[2] C07D *339/06, 263/22*

U.S. Cl. 260—307 C **3 Claims**

1. A process for the preparation of ethylenedithiocarbonate which comprises reacting 1,2-dimercaptoethane with carbon monoxide and oxygen in the presence of a selenium catalyst.

2. A process for the preparation of 1,3-dithiolan-2-one-4-hydroxymethyl which comprises reacting 2,3-dimercaptopropanol-1 with carbon monoxide and oxygen in the presence of a selenium catalyst.

3. A process for the preparation of 2-oxazolidone which comprises reacting ethanolamine with carbon monoxide and oxygen in the presence of a cuprous chloride catalyst.

4,042,596

2-ALKYL-5-PHENETHYL-4-OXAZOLECARBOXYLIC ACIDS AND DERIVATIVES

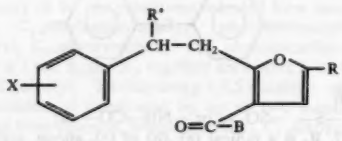
William G. Salmond, Mount Arlington, N.J., assignor to Sandoz, Inc., E. Hanover, N.J.

Division of Ser. No. 538,887, Jan. 6, 1975, Pat. No. 3,994,915, which is a continuation of Ser. No. 267,899, June 30, 1972, abandoned. This application Sept. 1, 1976, Ser. No. 719,679

Int. Cl.[2] C07D *263/32*

U.S. Cl. 260—307R **7 Claims**

1. A compound of the formula



wherein

1 is either $—OR^1$, —OH or —Y,

R is alkyl having from 1 to 4 carbon atoms;

Y is chloro, bromo or iodo;

X is a hydrogen atom or fluoro, chloro or bromo;

R^1 is alkyl having from 1 to 6 carbon atoms;

R° is either a hydrogen atom or phenyl; provided that when R° is phenyl, then X is a hydrogen atom.

4,042,597

PREPARATION OF 2-(2-HYDROXY-2-PROPYL)-1-METHYL-5-NITROIMIDAZOLE

Werner Hofheinz, Bottmingen, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Mar. 22, 1976, Ser. No. 668,899

Claims priority, application Switzerland, Apr. 4, 1975, 4291/75; Jan. 23, 1976, 826/76

Int. Cl.² C07D *233/94*

U.S. Cl. 548—339 **6 Claims**

1. A process for the preparation of 2-(2-hydroxy-2-propyl)-1-methyl-5-nitroimidazole which comprises autoxidizing 1-methyl-2-isopropyl-5-nitroimidazole in a dipolar aprotic solvent in the presence of a strong base and a reducing agent comprising triethylphosphite.

4,042,598

DISUBSTITUTED AZABICYCLOALKANES

Laszlo Beregi, Boulogne; Pierre Hugon, Rueil-Malmaison; Xavier Pascaud, Paris, and Jean-Claude Poignant, Bures, Yvette, all of France, assignors to Science Union et Cie, Societe Francaise de Recherche Medicale, Suresnes, France

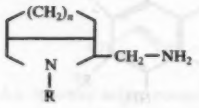
Division of Ser. No. 525,623, Nov. 20, 1974, Pat. No. 3,972,994. This application May 13, 1976, Ser. No. 685,757

Claims priority, application United Kingdom, Dec. 14, 1973, 58034/73

Int. Cl.² C07D *209/44*

U.S. Cl. 260—326.1 **2 Claims**

1. A compound selected from the group consisting of bicycloalkanes derivatives of the formula:



wherein *n* is 2, and where in R is selected from the group consisting of saturated and unsaturated aliphatic hydrocarbon radicals having 1 to 5 carbon atoms inclusive in the form of a straight or branched chain.

4,042,599

PROCESS FOR PRODUCING 2-PYRROLIDONE

Janice L. Greene, Chagrin Falls, Ohio, assignor to The Standard Oil Company, Cleveland, Ohio

Filed June 30, 1975, Ser. No. 591,882

Int. Cl.² C07D *207/26*

U.S. Cl. 260—326.5 FN **3 Claims**

1. In the process for the preparation of 2-pyrrolidone by contacting an aqueous mixture of succinonitrile with hydrogen at an elevated temperature in the presence of a hydrogenation catalyst, the improvement comprising conducting the reaction at a hydrogen pressure within the range of from 300 to 490 psi.

4,042,600

PYROLYSIS OF 2-SULFOCHLORIDE BENZOATES

Carmine A. DiPippo, Longmeadow, Mass., assignor to Scott Paper Company, Philadelphia, Pa.

Continuation of Ser. No. 298,226, Oct. 17, 1972, abandoned. This application Oct. 7, 1975, Ser. No. 620,281

Int. Cl.² C07D *327/04*; C07C *19/02, 25/14*

U.S. Cl. 260—327 S **10 Claims**

1. The method for the synthesis of ortho-sulfobenzoic anhydride which comprises pyrolyzing a 2-sulfochloride benzoate at elevated temperatures.

4,042,601

SIX MEMBERED HETEROCYCLIC OXATHIO COMPOUNDS

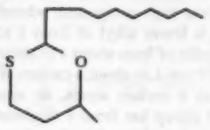
Richard A. Wilson, Westfield; John V. Pascale, Jackson, and Manfred Hugo Vock, Locust, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation-in-part of Ser. No. 594,310, July 8, 1975. This application Apr. 12, 1976, Ser. No. 676,390

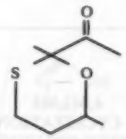
Int. Cl.² C07D *327/06*

U.S. Cl. 260—327 M **2 Claims**

1. An oxathio heterocyclic compound which is 2-n-nonyl-6-methyl-1,3-oxathiane having the structure:



2. An oxathio heterocyclic compound which is 2,6-dimethyl-2-acetyl-1,3-oxathiane having the structure:



4,042,602

SYNTHESIS OF DIDEOXYZEARALANE AND RELATED COMPOUNDS

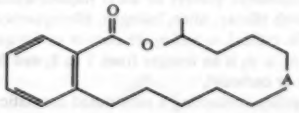
Donald Edwin Robertson, Terre Haute, Ind.; Wilbert Herbert Urry, Chicago, Ill., and Frank Kavka, St. Louis, Mo., assignors to IMC Chemical Group, Inc., Terre Haute, Ind.

Filed Nov. 4, 1976, Ser. No. 738,930

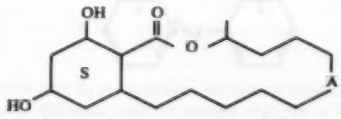
Int. Cl.² C07D *313/00*

U.S. Cl. 260—343.41 **5 Claims**

1. A method for preparing a dideoxyzearalane type compound of the formula



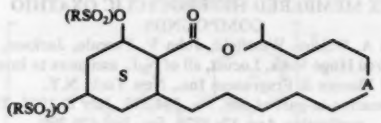
comprising the steps of reacting a hexahydrozearalin of the formula



with an organic sulfonyl chloride of the formula

R SO_2 Cl

under esterifying conditions to form a sulfonate ester derivative of the formula



recovering the sulfonate ester derivative; and catalytically dehydrosulfonyloxylating and aromatizing the sulfonate ester derivative by heating it to a temperature of from about 75° C to about 250° C in the presence of an organic base and a palladium catalyst under a substantially inert atmosphere to form the dideoxyzearalane type compound; wherein A is $-CH_2-$, or $>CHOR_1$; R_1 is lower alkyl of from 1 to about 6 carbon atoms, lower alicyclic of from about 4 to about 8 carbon atoms; lower alkanoyl of from 1 to about 6 carbon atoms, monocyclic aryl of about 6 to 8 carbon atoms, or monocyclic aralkyl, wherein the alkyl group has from 1 to about 5 carbon atoms and the aryl group has about 6 to 8 carbon atoms; and R is selected from the group consisting of lower alkyl of from 1 to about 10 carbon atoms, phenyl, p-tolyl, and p-bromophenyl.

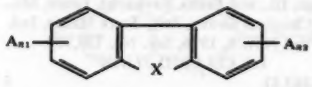
4,042,603

INTRAMOLECULAR CYCLIZATION IN A FATTY ACID ESTER SOLVENT

Hiroshi Itatani; Mikito Kashima; Akinori Shiotani; Hataaki Yoshimoto, and Tetuo Kato, all of Ichihara, Japan, assignors to UBE Industries, Ltd., Ube, Japan

Filed Mar. 17, 1975, Ser. No. 559,065
Claims priority, application Japan, Mar. 29, 1974, 49-34618
Int. Cl.² C07D *307/91*
U.S. Cl. 260—346.71 **20 Claims**

1. A process for preparing a compound having the formula:



(2)

wherein

A represents an alkyl, alkoxyl, nitro, halogen, alkanoyloxy, alkoxycarbonyl, phenyl or alkyl radical which is substituted with alkoxy, nitro, halogen, alkoxycarbonyl, phenyl or nitrile radical, n_1 and n_2 are zero or an integer from 1 to 4, and $n_1 + n_2$ is an integer from 1 to 8; **and X represents oxygen or carbonyl,**

which comprises contacting a substituted aromatic compound having the formula

(1)

wherein

A, n_1, n_2 and X have the same meanings as above and the above compound has at least two hydrogen atoms at both the 2- and 2'-positions with at least one of a carboxylic acid salt of palladium and a palladium organic complex as a catalyst under pressure of an oxygen-containing atmosphere and in a fatty acid ester solvent whereby said compound (1) is cyclized intramolecularly.

4,042,604

ISOLATION OF DINITROANTHRAQUINONE HAVING A HIGH CONTENT OF α,α-DINITRO COMPOUNDS

Heinz Eilingsfeld, Frankenthal, and Dietrich Lach, Ludwigshafen, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed May 14, 1976, Ser. No. 686,365
Claims priority, application Germany, June 4, 1975, 2524747
Int. Cl.² C09B *1/00*; C07C *79/37*
U.S. Cl. 260—369 **8 Claims**

1. A process for the isolation of a mixture of 1,5-dinitroanthraquinone and 1,8-dinitroanthraquinone having a high content of α,α'-isomers from a crude dinitroanthraquinone mixture which process comprises first suspending the crude dinitroanthraquinone mixture in from one to thirty times its own weight of xylene, heating the suspension to a temperature within the range of from 60° to 200° C mixing the suspension until solution equilibrium has been established, and then separating the undissolved material from the suspension at the same temperature used for said mixing.

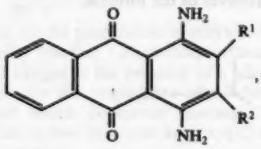
4,042,605

PROCESS FOR THE PRODUCTION OF 1,4-DIAMINOANTHRAQUINONE-2,3-DINITRILE

Ernst Hartwig, Heidelberg, Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed May 14, 1976, Ser. No. 686,366
Claims priority, application Germany, June 4, 1975, 2524748
Int. Cl.² C09B *1/00, 1/36*
U.S. Cl. 260—378 **17 Claims**

1. A process for the production of 1,4-diaminoanthraquinone-2,3-dinitrile which comprises reacting a 1,4-diaminoanthraquinone of the formula



in which each of R^1 and R^2 is hydrogen, chloro or bromo with the proviso that at least one of R^1 and R^2 is chloro or bromo, at a temperature of from 60° up to about 160° C. in a polar aprotic solvent with at least the stoichiometrically required amount of an ionic cyanide.

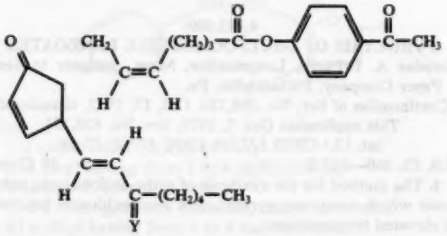
4,042,606

SUBSTITUTED PHENYL ESTERS OF PGA_2

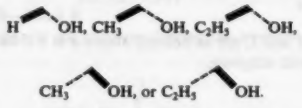
Walter Morozowich, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation of Ser. No. 531,991, Dec. 12, 1974, which is a division of Ser. No. 431,598, Jan. 8, 1974, Pat. No. 3,931,281.
This application July 12, 1976, Ser. No. 704,263
Int. Cl.² C07C *177/00*
U.S. Cl. 260—390 **12 Claims**

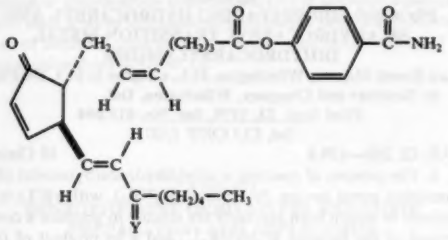
1. An optically active compound of the formula:



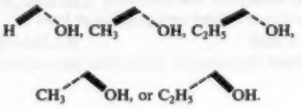
or a racemic compound of that formula and the mirror image thereof, wherein Y is



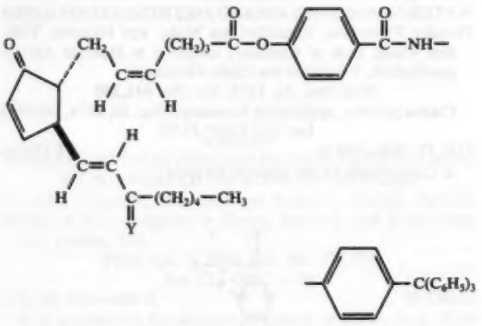
5. An optically active compound of the formula:



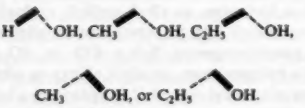
or a racemic compound of that formula and the mirror image thereof, wherein Y is



9. An optically active compound of the formula:



or a racemic compound of that formula and the mirror image thereof, wherein Y is



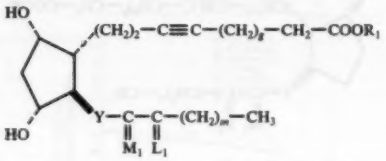
4,042,607

4,4,5,5-TETRADEHYDRO-PGF$_{1\alpha}$ ANALOGS

Chiu-Hong Lin, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 619,077, Oct. 2, 1975, Pat. No. 4,013,695.
This application Nov. 4, 1976, Ser. No. 738,719
Int. Cl.[2] C07C *177/00*
U.S. Cl. 260—410.9 R 32 Claims

1. A prostaglandin analog of the formula



wherein *g* is one, 2, or 3;
wherein Y is trans—CH=CH—;
wherein M_1 is

or

wherein R_5 is hydrogen or methyl;
wherein *m* is one to 5, inclusive;
wherein L_1 is

or a mixture of

and

wherein R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro; and wherein R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

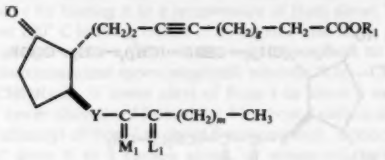
4,042,608

4,4,5,5-TETRADEHYDRO-11-DEOXY-PGE$_1$ ANALOGS

Chiu-Hong Lin, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 619,077, Oct. 2, 1975, Pat. No. 4,013,695.
This application Nov. 4, 1976, Ser. No. 738,676
Int. Cl.^{2} C07C *177/00*
U.S. Cl. 260—410.9 R **32 Claims**

1. A prostaglandin analog of the formula



wherein g is one, 2, or 3;
wherein Y is trans—CH=CH—;
wherein M_1 is

wherein R_5 is hydrogen or methyl;
wherein m is one to 5, inclusive;
wherein L_1 is

or a mixture of

and

wherein
R_3 and R_4 are hydrogen, methyl, or fluoro, being the same or different, with the proviso that one of R_3 and R_4 is fluoro only when the other is hydrogen or fluoro; and wherein
R_1 is hydrogen, alkyl of one to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, phenyl substituted with one, two, or three chloro or alkyl of one to 3 carbon atoms, inclusive, or a pharmacologically acceptable cation.

4,042,609

σ AND π ORGANIC COMPLEXES OF TRANSITION METALS AND PROCESS FOR THE PREPARATION THEREOF

Emilio Perrotti, and Mario Clerici, both of San Donato Milanese, Italy, assignors to Snam Progetti S.p.A., Milan, Italy

Continuation of Ser. No. 419,374, Nov. 27, 1973, abandoned.
This application Feb. 2, 1976, Ser. No. 654,350
Claims priority, application Italy, Nov. 29, 1972, 32211/72
Int. Cl.^{2} C07F *15/00, 13/00*
U.S. Cl. 260—429 R **22 Claims**

1. A process for the preparation of a σ complex of a transition metal having catalytic properties and represented by the formula

$$M(C_2H_4)_2(L\text{-}C)(L)$$

in which M is Ir or Re; L is an alkyl or aryl phosphine of formula PR_3 wherein R is an isopropyl, tert-butyl, or phenyl radical; and L-C is an alkyl or aryl phosphine ligand of formula PR_2R^-, in which R is as defined above R^- represents the R radical less one hydrogen, said ligand being in coordination with the M atom, which comprises:
reacting a hydride complex of formula

$$MH_xL_2$$

in which M and L are as defined above x is 5 if M is Ir or 7 if M is Re, with ethylene.

4,042,610

PROCESS FOR PREPARING HYDROCARBYL AND SILAHYDROCARBYL TRANSITION METAL DIHYDROCARBYLAMIDES

Leo Ernest Manzer, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 22, 1975, Ser. No. 615,494
Int. Cl.^{2} C07F *7/00*
U.S. Cl. 260—429.3 **15 Claims**

1. The process of reacting a poly(dihydrocarbylamide) of a transition metal having the formula $M(NR_2)_x$ with yR'Li in a solvent in which both reactants are soluble to produce a compound of the formula $R'_yM(NR_2)_{x-y}$ and a by-product of the formula $LiNR_2$ which in insoluble in the solvent wherein
M is titanium, zirconium, hafnium, vanadium, niobium, tantalum, chromium, molybdenum or tungsten;
R is alkyl, aryl or aralkyl;
R' is alkyl, silaalkyl in which the silicon is bonded solely to carbon, aralkyl or diarylmethyl;
x is the valence of the metal and is at least 3;
y is 1 to 5; and
x-y is at least 1.

4,042,611

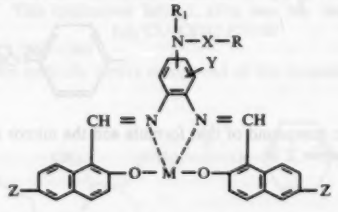
WATER-IN-SOLUBLE DISAZO METHINE COMPOUNDS

Theodor Papenfuhs, Frankfurt am Main, and Heinrich Volk, Bad Vilbel, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Dec. 16, 1975, Ser. No. 641,260
Claims priority, application Germany, Dec. 20, 1974, 2460490
Int. Cl.^{2} C07F *15/02*
U.S. Cl. 260—439 R **8 Claims**

1. Compounds of the general formula

(I)



wherein R is hydrogen, an alkyl, aralkyl, cycloalkyl, aryl, an amino group which may be substituted by alkyl or aryl radicals, or a guanidino group, X is a -CO- or -SO_2-group, Y is hydrogen, a halogen atom, an alkyl, alkoxy or nitro group, R_1 is hydrogen or an alkyl radical, Z is hydrogen, a halogen atom, an alkoxy, nitro or cyano group and M is nickel or copper.

4,042,612

POLYMERIC ALKOXYSILANES

Walter L. Magee, Jr., Norwalk, Conn., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Jan. 3, 1977, Ser. No. 756,310
Int. Cl.[2] C07F 7/18
U.S. Cl. 260—448.8 R 6 Claims

1. A polymeric alkoxysilane having the average formula

$$Si(OR)_a(O-\overset{\overset{O}{\|}}{S}-R^1)_bO_{\frac{4-a-b}{2}}$$
$$\overset{\|}{O}$$

wherein each R is an independently selected hydrocarbon radical or hydrocarbon ether radical free of aliphatic unsaturation, each R^1 is an independently selected hydrocarbon radical free of aliphatic unsaturation, a has a value from 1 to 3 and b has a value from 0.001 to 1.0.

4,042,613

BENZOPHENONE DERIVATIVES AND THEIR PREPARATION AND APPLICATION

Minoru Takamizawa; Yasushi Yamamoto; Yoshio Inoue, all of Annaka; Atsumi Noshiro, Chiba, and Hitoshi Fujii, Tokyo, all of Japan, assignors to Dai Nippon Printing Co., Ltd. and Shin-Etsu Chemical Co., Ltd., both of Tokyo, Japan

Filed Apr. 21, 1975, Ser. No. 569,756
Claims priority, application Japan, Apr. 23, 1974, 49-45711; July 31, 1974, 49-87612
Int. Cl.[2] C07F 7/08
U.S. Cl. 260—448.2 B 32 Claims

1. A benzophenone derivative represented by the general formula

$$R_m^1 - C_6H_{5-m} - CO - C_6H_{5-n} - R_n^2$$

where R^1 is selected from the group consisting of a halogen atom, a monovalent C_{1-10} hydrocarbon group, an alkoxy group, a thioalkoxy group, an amino group, and a dialkylamino group, R^2 is an unsubstituted or organosiloxy-substituted organosilyl group, and each of *m* and *n* is an integer of from 1 to 5.

4,042,614

HYDROCARBON SYNTHESIS FROM CO AND H_2 USING RU SUPPORTED ON A TITANIUM OXIDE

M. Albert Vannice, Plainfield, and Robert L. Garten, Summit, both of N.J., assignors to Exxon Research and Engineering Co., Linden, N.J.

Filed Apr. 5, 1976, Ser. No. 673,356
Int. Cl.[2] C07C 1/04
U.S. Cl. 260—449 R 23 Claims

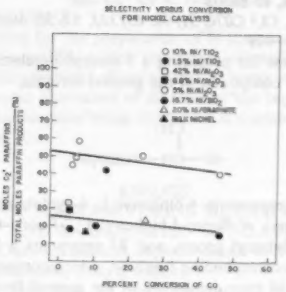
1. A process for the selective synthesis of olefins from C_2 to C_{10} chain length inclusive, said process comprising the steps of passing H_2 and CO at a H_2/CO ratio of 0.1 to 10 over a catalyst comprising ruthenium on a titanium-containing oxide support, wherein said titanium-containing oxide support is selected from the group consisting of TiO_2, $ZrTiO_4$, TiO_2-carbon, TiO_2-Al_2O_3, TiO_2-SiO_2, alkaline earth titanates, alkali titanates, rare earth titanates and mixtures thereof, at a space velocity of from 100 to 50,000 V/V/Hr. at a temperature of from 100° to 500° C., at a pressure of from 100 to 10^5kPa for a time sufficient to effect the generation of the desired olefinic products in the desired ratio wherein the concentration of said ruthenium in said catalyst is from 0.01 to 15% by weight.

4,042,615

HYDROCARBON SYNTHESIS FROM CO AND H_2 USING Ni SUPPORTED ON A TITANIUM OXIDE

M. Albert Vannice, Plainfield, and Robert L. Garten, Summit, both of N.J., assignors to Exxon Research and Engineering Co., Linden, N.J.

Filed Apr. 5, 1976, Ser. No. 673,357
Int. Cl.[2] C07C 1/04
U.S. Cl. 260—449.6 R 21 Claims



1. A process for the synthesis of higher molecular weight paraffins comprising the steps of passing CO and H_2 in a CO/H_2 ratio of 10 to 0.1 over a catalyst comprising nickel on a titanium-containing oxide support, wherein said titanium-containing oxide support is selected from the group consisting of TiO_2, $ZrTiO_4$, TiO_2-carbon, TiO_2—Al_2O_3, TiO_2—SiO_2, alkaline earth titanates, alkali titanates, rare earth titanates and mixtures thereof, at a space velocity of from 100 to 50,000 V/V/Hr. and a temperature of from 100° to 500° C and at pressures of from 103 to 1.03×10^5kPa for a time sufficient to effect the generation of the desired paraffinic products in the desired ratio, wherein the concentration of said nickel in said catalyst is from 0.01 to 75% by weight.

4,042,616

PREPARATION OF CYCLOPROPANECARBOXYLATES

Pieter A. Verbrugge, and Elisabeth W. Uurbanus, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Oct. 29, 1974, Ser. No. 518,855
Claims priority, application United Kingdom, Nov. 2, 1973, 51005/73
Int. Cl.[2] C07C 67/30
U.S. Cl. 260—468 G 10 Claims

1. A process or the production of a tertalkyl 1-hydrogen-2-alkylcyclopropanecarboxylate in which process (A) a tert-alkyl 1-hydrogen-2-halocyclopropanecarboxylate in which the halogen atom(s) has (have) an atomic number of at least 17 and the tert-alkyl group is a tert-alkyl group of from 4 to 7 carbon atoms or a tert-cycloalkyl group of from 7 to 9 carbon atoms, is contacted in solution with an alkylmagnesium halide in which the halogen atom has an atomic number of at least 17, or with a dialkylmagnesium, in which each of said alkyl groups contains up to 20 carbon atoms and (B) adding a proton donor to the reaction product thus produced.

4,042,617
PROCESS FOR PREPARING A 2-METHYL-(SUBSTITUTED ARYL)-PYRUVIC ACID COMPOUND

Katsura Kogure, Kawagoe; Noriyoshi Sueda, Tokyo; Sizuo Himoto, Kawagoe; Youziro Yoshino, Tokyo, and Kunio Nakagawa, Kawagoe, all of Japan, assignors to Nisshin Flour Milling Co., Ltd., Tokyo, Japan

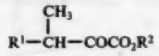
Filed July 28, 1975, Ser. No. 599,773

Claims priority, application Japan, July 27, 1974, 49-85620; July 29, 1974, 49-86003

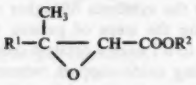
Int. Cl.[2] C07C *51/09, 63/333, 67/30, 69/76*

U.S. Cl. 260—469 **3 Claims**

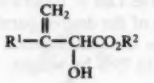
1. A process for preparing a 3-methyl-3-(substituted aryl)-pyruvic acid compound of the general formula,



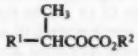
wherein R^1 represents 4-biphenylyl, 4-cyclohexylphenyl, 3-phenoxyphenyl, 4'-fluoro-4-biphenylyl, 2-fluoro-4-biphenylyl or 3-benzoylphenyl group, and R^2 represents a lower alkyl group or its corresponding free acid, which comprises treating a glycidic acid ester compound of the general formula,



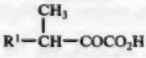
wherein R^1 and R^2 are individually as defined above with a Lewis acid, thereby to form a compound of the general formula,



wherein R^1 and R^2 are individually as defined above; treating the thus resulted compound in an alchohol with an alkali metal alcoholate thereby to form 3-methyl-3-(substituted aryl)-pyruvic acid ester of the general formula,



wherein R^1 and R^2 are individually as defined above and, if desired, saponifying said ester to yield a compound of the general formula,



wherein R^1 is as defined previously.

4,042,618
AROMATIC SULFONATES

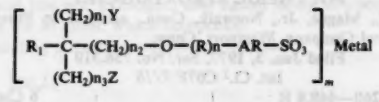
Gerald A. Davis, Charlotte, N.C., and Robert W. Stackman, Morristown, N.J., assignors to Celanese Corporation, New York, N.Y.

Division of Ser. No. 27,942, April 13, 1970, Pat. No. 3,706,712, which is a continuation-in-part of Ser. No. 833,729, June 16, 1969, abandoned. This application June 15, 1972, Ser. No. 263,086

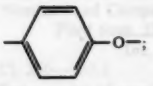
Int. Cl.[2] C07C *143/42*

U.S. Cl. 260—470 **6 Claims**

1. The metallic salt of the structure

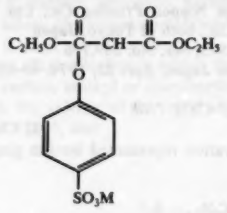


wherein R_1 represents either hydrogen or an alkyl radical containing from 1 to 6 carbon atoms; n_1, n_2, and n_3 each independently represent an integer from 0 to about 6 and $n_1 + n_2 + n_3$ is equal to or greater than 2 if Y and Z both are hydroxy; Y and Z are selected independently from the group consisting of hydroxy, carboxy and alkoxycarbonyl, the alkoxy portion of which contains from 1 to 6 carbon atoms; Ar represents an unsubstituted divalent aromatic hydrocarbon radical containing from 6 to about 12 carbon atoms; m is an integer equal to the valency of the metal; R represents a divalent radical selected from the group consisting of alkylene and



and n is an integer, either 0 or 1, and when n is 0, Metal is lithium.

6. An ester having the formula:



wherein M is lithium.

4,042,619
DERIVATIVES OF CARBOXY-TERMINATED POLYBUTADIENES

Ralph E. Miegel, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 3, 1965, Ser. No. 453,892

Int. Cl.[2] C07C *101/26, 69/52*

U.S. Cl. 260—482 P **7 Claims**

1. Polybutadiene terminated with —C(O)OR groups, R being hydroxyalkyl.

2. A difluoramino derivative of a p lymer of claim **1**, said derivative having a difluoramino content of at least about 20% by weight and having the difluoramino groups appended to the polymer chain.

4,042,620
CONTINUOUS PROCESS FOR THE PRODUCTION OF MAEAMIC ACIDS

Jean Laforest, St. Cyr au Mont d'Or; Louis Silhol, St. Genis Laval, and Pierre Renard, Villeurbanne, all of France, assignors to Rhone-Poulenc, S.A., Paris, France

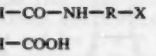
Continuation of Ser. No. 432,646, Jan. 11, 1974, abandoned. This application Apr. 24, 1975, Ser. No. 571,108

Claims priority, application France, Jan. 16, 1973, 73.01405

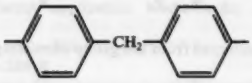
Int. Cl.[2] C07C *51/00*

U.S. Cl. 260—518 R **7 Claims**

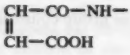
1. A continuous process for the preparation of a maleamic acid of the formula:



in which R represents the radical



and X represents the radical:



which comprises passing a solution of a primary diamine and a solution of maleic anhydride in amounts such that there is a 5 to 20 mol % excess of anhydride, at a temperature of from 40° to 130° C. and at a rate greater than 7 m/second through an injection nozzle into a twin screw reactor, the solvent for the primary amine being the same as, or miscible with, the solvent for the maleic anhydride.

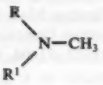
4,042,621

OXIDATION OF N-SUBSTITUTED METHYLAMINES TO N-SUBSTITUTED FORMAMIDES

John Carl Sauer, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sept. 22, 1975, Ser. No. 615,497
Int. Cl.[2] C07C *103/36*
U.S. Cl. 260—561 R **24 Claims**

1. The process of reacting in a liquid homogeneous system molecular oxygen with a compound of the formula



wherein

R is alkyl of 1–8 carbons, aryl of 6–10 carbons, aralkyl of 7–10 carbons or alkaryl of 7–10 carbons;

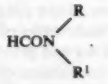
R^1 is aryl of 6–10 carbons, aralkyl of 7–10 carbons, alkaryl of 7–10 carbons, alkyl of 1–8 carbons or such alkyl containing $—N(CH_3)R^2$

in which R^2 is hydrogen, alkyl of 1–8 carbons, aryl of 6–10 carbons, aralkyl of 7–10 carbons or alkaryl of 7–10 carbons;

with the provisos that

R and R^1 can be joined together to form an alkylene or azaalkylene group of 3–8 carbons; and

when R is alkyl or aralkyl, R^1 can be hydrogen; in the presence of a catalytically effective amount of a soluble chloride, bromide or iodide of a metal selected from the group consisting of cobalt, copper, gold, iron, manganese, mercury, nickel, palladium, platinum, rhenium, silver and zinc; at a temperature in the range 25°–160° C and at an oxygen pressure in the range atmospheric to 500 pounds per square inch gauge; and recovering an N-substituted formamide of the formula



4,042,622

PROCESS FOR THE PREPARATION OF N-ACETOACETYL-2,5-DIMETHOXY-4-CHLOROANILIDE

Emmerich Paszthory, Hofheim, Taunus; Ernst Hille, Rossert, Taunus; Karl-Gerhard Seifert, Frankfurt am Main, and Vincenz Zimmermann, Nauheim, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Apr. 27, 1976, Ser. No. 680,670
Claims priority, application Germany, Apr. 29, 1975, 2518984
Int. Cl.[2] C07C *102/00*
U.S. Cl. 260—562 K **8 Claims**

1. A process for the preparation of N-acetoacetyl-2,5-dimethoxy-4-chloroanilide which comprises suspending 2,5-dimethoxy-4-[chloroanilide] chloroaniline in water and adding at least one molar equivalent of diketene at the beginning of the reaction, said reaction being conducted at a temperature not in excess of 50° C.

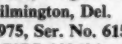
4,042,623

METHOD OF MANUFACTURING METHACRYLIC ACID AND AN OXIDATION CATALYST

Masanobu Ogawa, Takasaki, Japan, assignor to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

Filed Sept. 16, 1975, Ser. No. 613,921
Claims priority, application Japan, Sept. 24, 1974, 49-108889; Sept. 24, 1974, 49-108890
Int. Cl. C07C *51/32;* B01J *27/14*
U.S. Cl. 260—530 N **10 Claims**

1. A catalyst having the following composition:



wherein, Pd, P, Sb and O denote palladium, phosphorus, antimony and oxygen, respectively, X denotes at least one element selected from the group consisting of bismuth, lead, chromium, iron, nickel, cobalt, manganese, tin, uranium and barium, the subscripts *a, b, c, d* and *e* denote the numbers of the Pd, P, Sb, X and O atoms with the proviso that the elements are present in a ratio so that when *a* is 1, then *b* is 1 to 42, *c* is 0.1 to 15, *d* is 0 to 15 and *e* is automatically determined from the valencies of the other elements.

4,042,624

ANTIDEPRESSANT 2-[(SUBSTITUTED-1-NAPHTHYLMETHYL)AMINO]-1-PHENYLPROPANOLS

Thomas J. Schwan, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed May 12, 1975, Ser. No. 576,448
Int. Cl.[2] C07C *91/22*
U.S. Cl. 260—570.6 **2 Claims**

1. The compound 2-(5,8-dichloro-1-naphthylmethylamino)-1-phenyl-1-propanol hydrochloride.

2. The compound 2-(2-methoxy-1-naphthylmethylamino)-1-phenyl-1-propanol hydrochloride.

4,042,625

PROCESS AND CATALYST FOR PREPARING UNSATURATED CARBOXYLIC ACID

Hideo Matsuzawa; Masato Otani; Hiromichi Ishii, all of Ohotake; Kantaro Yamada, Yokohama, and Hasao Kobayashi, Ohotake, all of Japan, assignors to Mitsubishi Rayon Company, Ltd., Tokyo, Japan

Filed June 25, 1975, Ser. No. 590,505
Claims priority, application Japan, July 3, 1974, 49-76593
Int. Cl.[2] C07C *51/24;* B01J *27/02, 27/14*
U.S. Cl. 260—530 N **7 Claims**

1. In a process for preparing acrylic acid or methacrylic acid by the vapor-phase catalytic oxidation of the corresponding unsaturated aldehyde with molecular oxygen at a temperature of from 240° – 450° C, the improvement comprising:

reacting said unsaturated aldehyde over a catalyst consisting essentially of molybdenum, phosphorus, magnesium, element Q, element R, element T and oxygen represented by the formula:

$$Mo_{12}P_aMg_bQ_{b'}R_cT_dO_e$$

wherein Mo is molybdenum, P is phosphorus, Mg is magnesium, O is oxygen, Q is at least one metal selected from the group consisting of calcium, strontium and barium, R is at least one metal selected from the group consisting of potassium, rubidium, cesium and thallium, T is at least one metal selected from the group consisting of vanadium, tungsten and nickel, *a*, *b*, *b'*, *c*, *d* and *e* are atomic ratios of the respective elements, wherein $a = 0.5$–6, $b = 0.2$–6, $b + b' = 0.2$–6, b' ranges from 0 to a value determined by the magnesium content of the catalyst and the limits of $b + b'$, $c = 0.2$–6, $d = 0$–6, and e is a value dependent upon the oxidation state of the catalyst.

4,042,626

INTEGRATED TWO-STAGE UREA SYNTHESIS

Lucien H. Cook, Port Washington, N.Y., assignor to Chemical Construction Corporation, New York, N.Y.

Filed July 12, 1972, Ser. No. 271,072

Int. Cl.[2] C07C *126/00*

U.S. Cl. 260—555 A **7 Claims**

1. A process for urea synthesis which comprises combining carbon dioxide and primary ammonia feed streams with recycled aqueous ammonium carbamate solution to form a synthesis feed stream having an overall ammonia to carbon dioxide molar ratio in the range of 2.3:1 to 3.0:1, reacting said synthesis feed stream at elevated pressure to form further ammonium carbamate and generate heat in a first reaction zone and in indirect heat exchange with a urea synthesis reaction stream, heating secondary ammonia by indirect heat exchange with said urea synthesis reaction stream, adding the resulting heated secondary ammonia to the reacted synthesis feed stream principally containing ammonium carbamate, whereby said urea synthesis reaction stream is formed with a molar ammonia to carbon dioxide ratio above 3.0:1, reacting said urea synthesis reaction stream during said indirect heat exchanges with ammonia and synthesis feed stream in a second reaction zone, said second reaction zone being at substantially the same elevated pressure as said first reaction zone, whereby a major portion of the ammonium carbamate in said urea synthesis reaction stream is dehydrated to synthesize urea, and processing the resulting synthesis effluent stream at reduced pressure to recover aqueous urea solution and form said aqueous ammonium carbamate solution.

4,042,627

DIPHENYLAMINES FOR DYEING KERATINOUS FIBERS

Gregoire Kalopissis, Paris; Andree Bugaut, Boulogne-sur-Seine, and Francoise Estradier, Paris, all of France, assignors to L'Oreal, Paris, France

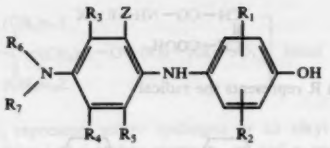
Continuation of Ser. No. 396,296, Sept. 11, 1973, abandoned, which is a division of Ser. No. 270,650, July 11, 1972, Pat. No. 3,787,174, which is a continuation-in-part of Ser. No. 61,833, Aug. 6, 1970, Pat. No. 3,792,090. This application Sept. 30, 1975, Ser. No. 618,244

Claims priority, application Luxembourg, July 14, 1971, 63527; Aug. 11, 1969, 59265

Int. Cl.[2] C07C *91/42*

U.S. Cl. 260—571 **3 Claims**

1. A diphenylamine of the formula



wherein R_1 is selected from the group consisting of methyl and chlorine,

R_2 is selected from the group consisting of hydrogen and methyl,

R_3 is selected from the group consisting of hydrogen and methyl,

R_4 is selected from the group consisting of hydrogen, methyl and methoxy,

R_5 is hydrogen,

R_6 is selected from the group consisting of hydrogen and methyl,

R_7 is selected from the group consisting of hydrogen and methyl, and

Z is amino.

4,042,628

2,6-DINITRO-4-TRIFLUOROMETHYLANILINES

Karl Kiehs; Karl-Heinz Koenig, both of Ludwigshafen, and Adolf Fischer, Mutterstadt, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Continuation of Ser. No. 174,158, Aug. 23, 1971, abandoned, and a continuation-in-part of Ser. No. 784,247, Dec. 16, 1968, Pat. No. 3,681,425. This application Mar. 20, 1975, Ser. No. 560,122

Claims priority, application Germany, Dec. 21, 1967, 1643719

Int. Cl.[2] C07C *87/62, 91/06, 93/14*; A01N *9/20*

U.S. Cl. 260—577 **2 Claims**

1. 2,6-dinitro-4-trifluoromethyl-N-propyl-N-β-chloroethylaniline.

4,042,629

PREPARATION OF HEXAMETHYLENE DIAMINE FROM 2-CYANOCYCLOPENTANONE AND ADIPONITRILE

Bernard John Kershaw, Kingston, Canada, assignor to Du Pont of Canada, Montreal, Canada

Filed June 4, 1976, Ser. No. 693,115

Int. Cl.[2] C07C *87/14*

U.S. Cl. 260—583 P **8 Claims**

1. A process for the manufacture of hexamethylene diamine comprising contacting 2-cyanocyclopentanone with a mixture comprising ammonia and hydrogen in the presence of a catalyst selected from the group consisting of promoted and unpromoted reduced iron oxide, at a temperature in the range 100° to 275° C and at a pressure in the range of 300 to 600 kg/cm^2, while maintaining the mole ratio of ammonia to 2-cyanocyclopentanone at at least 4:1 and providing sufficient hydrogen to prevent substantial conversion of the reduced catalyst to iron oxide.

4,042,630

PROCESS FOR THE PREPARATION OF CYCLOALKANONES AND CYCLOALKANOLS

Jan Wolters, Limbricht, and Jan L. J. P. Hennekens, Geleen, both of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands

Continuation-in-part of Ser. No. 408,048, Oct. 19, 1973, Pat. No. 3,987,101. This application June 1, 1976, Ser. No. 691,300
Claims priority, application Netherlands, June 7, 1975, 7506790
Int. Cl.² C07C 27/04
U.S. Cl. 260—586 R 8 Claims

1. In a process for preparing cycloalkanones and cycloalkanols by conversion of cycloalkylhydroperoxides in a liquid hydrocarbon vehicle under the influence of a solid heterogeneous chromium oxide catalyst, the improvement which comprises stripping the reaction mixture of said cycloalkylhydroperoxides with a stripping gas during said conversion so as to maintain the water content of the reaction mixture at or below the saturation concentration.

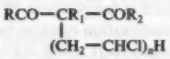
4,042,631

TELOMERS FROM β-DIKETONES AND VINYL CHLORIDE

Charles M. Starks, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed Apr. 9, 1975, Ser. No. 566,544
Int. Cl.² C07C 49/76
U.S. Cl. 260—593 H 10 Claims

1. Vinyl chloride telomers having the formula



wherein R and R_2 are selected from the group consisting of alkyl radicals containing from 1 to about 20 carbon atoms, aromatic radicals containing 6 to 10 carbon atoms, and alkyl substituted aromatic radicals, wherein the alkyl constituent contains from 1 to about 6 carbon atoms and wherein the aromatic moiety is phenyl or naphthyl; wherein R_1 is selected from the group consisting of hydrogen, alkyl radicals containing from 1 to about 20 carbon atoms, and halogen substituted alkyl radicals containing 1 to about 20 carbon atoms and wherein the halogen is chlorine, bromine, or fluorine; and *n* is an integer of from 1 to about 200.

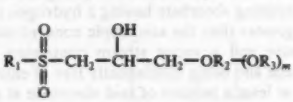
4,042,632

POLYOXY SULFOXIDES AND SULFONES AS ANTISTATIC AGENTS

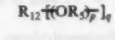
Kurt Hofer, Sr., and Kurt Hofer, Jr., both of Munchenstein, Switzerland, assignors to Sandoz Ltd., Basel, Switzerland

Continuation-in-part of Ser. No. 508,421, Sept. 23, 1974, abandoned. This application Aug. 6, 1975, Ser. No. 602,323
Int. Cl.² C07C 147/02
U.S. Cl. 260—607 AL 16 Claims

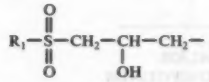
1. A compound of the formula,



wherein R_1 is alkyl (C_1-C_{22}) or alkyl (C_2-C_{22}) containing 1 or 2 alkylenethioalkylene, alkylenesulphinylalkylene or alkylenesulphonylalkylene functions, any alkyl or alkylene being unsubstituted or substituted by —OH; cycloalkyl (C_5 or C_6) or alkyl (C_1-C_6) cycloalkyl (C_5 or C_6); or a radical $-(R_5O)_xR_4$, wherein R_4 is alkyl (C_1-C_{22}), phenyl, phenyl substituted by 1 or 2 alkyl (C_1-C_{12}) radicals, or phenylalkyl (C_7-C_9), each R_5 is, independently, $-(CH_2)_2-$, $-(CH_2)_3-$ or $-CH(CH_3)CH_2-$ and *x* is an integer 1 to 180, *m* is an integer 1 to 7, R_2 is a group R_{12}, wherein R_{12} is an $(m + 1)$ valent saturated aliphatic hydrocarbon (C_2-C_{15}) radical or an $(m + 1)$ valent saturated aliphatic hydrocarbon (C_2-C_{15}) radical containing 1 or 2 alkyleneoxyalkylene, alkylenethioalkylene, alkylenesulphinylalkylene or alkylenesulphonylalkylene functions; a bivalent radical of benzene, cyclohexane, biphenyl, diphenyloxide, diphenylsulphide, diphenylsulphoxide, diphenylsulphone, diphenylmethane, 2,2-diphenylpropane, bis-cyclohexylmethane or 2,2-bis-cyclohexylpropane, or a group R_{12}



wherein R_{12} and R_5 are as defined above, *p* is an integer 1 to 500, and *q* is an integer 1 to $(m + 1)$, provided that when *q* is greater than 1, each moiety in square brackets is independent of each other such moiety, and the total number, *y*, of radicals OR_5 does not exceed 500,and each R_3 has, independently, one of the significances of R_1 or is hydrogen, phenyl, naphthyl or phenylalkyl (C_7-C_{12}), or phenyl, naphthyl or phenylalkyl (C_7-C_{12}) substituted on the aromatic nucleus thereof by 1 to 3 alkyl (C_1-C_{12}), 1 cycloalkyl (C_5 to C_{12}), 1 or 2 alkoxy (C_1-C_{18}), 1 or 2 halogen, 1 phenyl and/or 1 phenoxy substituent, with 1 to 3 substituents and 1 to 18 carbon atoms in the aggregate thereof, a group



wherein R_1 is as defined above, or a group

wherein R_6 is alkyl (C_1-C_{21}), perfluoroalkyl (C_3-C_{10}), phenyl or naphthyl, or phenyl or naphthyl substituted by 1 to 3 halogen, 1 or 2 alkyl (C_1-(C_{12}) or 1 or 2 alkoxy (C_1-C_{12}) substituents, with 1 to 3 substituents and 1 to 18 carbon atoms in the aggregate thereof with the proviso that the sum of *x* and *y* is a maximum of 500.

4,042,633

PROCESS FOR PREPARING DIISOPROPYL ETHER

Hanbury John Woods, Campbellville, Canada, assignor to Gulf Oil Canada Limited, Toronto, Canada

Filed June 7, 1976, Ser. No. 693,579
Int. Cl.² C07C 41/10, 41/06
U.S. Cl. 260—614 R 7 Claims

1. A process for the preparation of diisopropyl ether which comprises continuously feeding isopropanol, and optionally propylene, in the liquid phase under pressure into a reactor in which the feed material comes into effective contact with a solid catalyst, continuously withdrawing a mixture of reaction products and unreacted isopropanol and propylene from the reactor, and recovering diisopropyl ether from the mixture, said solid catalyst comprising acidic, sulfuric acid treated, Montmorilonite clay containing sufficient residual acidity to impart a pH below 4 thereto, said reactor being heated to maintain a temperature in the reactor in the range from substantially 120° C to substantially 250° C.

4,042,634

FLUOROCARBON SEPARATION PROCESS

Charles S. Cope, and Maurice J. Couture, both of Parkersburg, W. Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 15, 1976, Ser. No. 667,278
Int. Cl.[2] C07C *41/12*
U.S. Cl. 210—616 15 Claims

1. A process for separating vapors of tetrafluoroethylene and a fluoro(alkyl vinyl ether) of the formula $XCF_2(CF_2)_nO—CF=CF_2$ wherein X is F or H and *n* is an integer of 1–3, which comprises:

1. contacting a vapor comprising tetrafluoroethylene, and the fluoro(alkyl vinyl ether) with a liquid coolant solution consisting essentially of water and a solute selected from the group consisting of a) ethylene glycol present in an amount between about 50 and 85 percent by weight of water and solute and b) Ca Cl_2 present in an amount between about 22 and 33 percent by weight of the water and solute;

said liquid coolant solution on one hand and the fluoro(alkyl vinyl ether), on the other hand, being substantially immiscible; said contact being carried out at a temperature between about −40° C. and about 0° C.,

2. removing the liquid obtained from the contacting step,

3. separating the layer of ether from the layer of liquid coolant solution.

4,042,635

SPIRO COMPOUNDS

Paul Rys, Zurich, and Rolf Vogelsanger, Zumikon, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 528,620, Dec. 2, 1974, Pat. No. 3,950,403. This application Dec. 8, 1975, Ser. No. 638,573
Claims priority, application Switzerland, July 28, 1971, 11176/71
Int. Cl.[2] C07C *39/26*
U.S. Cl. 260—623 D 2 Claims

1. A compound which contains a group of the formula,

$$—(CH_2)_n—X \quad (1)$$

which is bonded directly to an aromatic nucleus of an at least bicyclic, aromatic six-membered naphthalene ring system, wherein *n* is a positive integer havng a value of 2 and X represents a halogen atom.

4,042,636

METHOD FOR THE PREPARATION OF ALCOHOL-FREE ALKALI AND ALKALINE EARTH METAL ALCOHOLATES

Arnold Lenz, Cologne-Stammheim, and Walter Rogler, Bonn, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Continuation of Ser. No. 482,977, June 25, 1974, Pat. No. 3,971,833. This application Nov. 12, 1975, Ser. No. 631,263
Claims priority, application Germany, July 2, 1973, 2333634
The portion of the term of this patent subsequent to Aug. 3, 1993, has been disclaimed.
Int. Cl.[2] C07C *29/00*
U.S. Cl. 260—632 A 1 Claim

1. A process for the preparation of an alcohol-free alkali or alkaline earth metal alcoholate in an inert hydrocarbonaceous solvent which comprises contacting at least an equimolar amount of an alkali radical or alkaline earth metal in an inert hydrocarbonaceous solvent, which solvent is inert to said alkali or alkaline earth metal, with a monovalent C_1–C_{24} alkanol at an elevated pressure in a closed vessel and at a temperature of at least that at which crystal alcohol split off from the corresponding alkali or alkaline earth metal alcoholate under normal pressure and below the temperature at which alkali or alkaline earth metal alcoholate decomposes under the prevailing pressure.

4,042,637

PROCESS OF PURIFYING VINYL CHLORIDE

Emmett Jean Glazer, Stow, and Edwin Studley Smith, Cuyahoga Falls, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Apr. 15, 1976, Ser. No. 677,642
Int. Cl.[2] C07C *21/00*
U.S. Cl. 260—652 P 5 Claims

1. The method which consists of contacting monomeric vinyl chloride with the zinc metal for a time sufficient for impurities in the vinyl chloride to react with said zinc metal to form an zinc compound and remove the impurity from the vinyl chloride.

4,042,638

PROCESS FOR PREPARING OLIGOMERS OF HEXAFLUOROPROPENE

Masahiro Ozawa, Kamifukuoka; Tadaaki Komatsu, Saitama, and Kimiaki Matsuoka, Kawagoe, all of Japan, assignors to Central Glass Co., Ltd., Ube, Japan

Filed Apr. 13, 1976, Ser. No. 676,494
Claims priority, application Japan, Apr. 17, 1975, 50-45818
Int. Cl.[2] C07C *21/18;* C08F *14/28*
U.S. Cl. 260—653.1 R 19 Claims

1. A process for preparing oligomers of hexafluoropropene comprising subjecting hexafluoropropene to an oligomerization reaction in the presence of an alkali metal halide and a crown ether at a reaction temperature of about from −20° C. to 200° C., said oligomerization reaction being carried out in an organic solvent which is inert under the oligomerization reaction conditions, said alkali metal halide being present in an amount greater than 0.001 mol per liter of said organic solvent and said crown ether being present in an amount greater than 1/50 time that of said alkali metal halide on a mol basis.

4,042,639

OXYCHLORINATION PROCESS

Theodore H. Gordon, and Herman Fred Kummerle, both of Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Continuation of Ser. No. 703,301, Feb. 6, 1968, abandoned. This application Nov. 20, 1974, Ser. No. 525,550
Int. Cl.[2] C07C *21/02*
U.S. Cl. 260—656 R 2 Claims

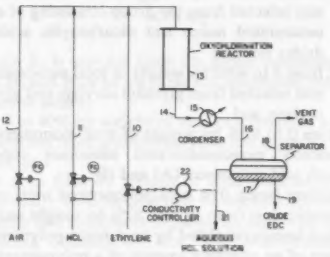
1. In the process for the vapor phase oxychlorination of ethane with oxygen and available chlorine at elevated temperatures in the presence of a catalyst comprising at least one compound of a multivalent metal to produce a vapor product comprising vinyl chloride, ethylene, hydrogen chloride and water which entrains some catalyst; the improvement which comprises condensing and absorbing from said vapor product inorganic constituents comprising said catalyst, hydrogen chloride and water, by intimately contacting said vapor product with a relatively cold, liquid, aqueous hydrogen chloride stream to form a resulting absorbate having a hydrogen chloride concentration greater than the azeotropic concentration at atmospheric pressure and a vapor stream containing vinyl chloride and ethylene and being substantially free of entrained catalyst, distilling at least a portion of said absorbate at a first pressure greater than atmospheric pressure to form an overhead of hydrogen chloride and a first stream of aqueous hydrogen chloride bottoms at substantially azeotropic concentration at said first pressure, recycling a first portion of said first stream of aqueous hydrogen chloride bottoms to said contacting step, distilling a second portion of said first stream of aqueous hydrogen chloride bottoms at a second pressure which is atmospheric pressure to form an overhead of water and a second stream of aqueous hydrogen chloride bottoms of substantially azeotropic concentration at said second pressure and

recycling said second stream of aqueous hydrogen chloride bottoms to said distillation at said first pressure.

4,042,640
OXYCHLORINATION OF HYDROCARBONS

Utah Tsao, Jersey City, N.J., assignor to The Lummus Company, Bloomfield, N.J.

Filed Nov. 6, 1975, Ser. No. 629,361
Int. Cl.² C07C *17/15*
U.S. Cl. 260—659 A **7 Claims**



1. In a process for oxychlorinating a hydrocarbon by direct contact of a hydrocarbon, oxygen and hydrogen chloride feed to produce a gaseous effluent, containing chlorinated hydrocarbon, water vapor and hydrogen chloride, the improvement comprising:

recovering aqueous hydrogen chloride from said gaseous effluent;

determining the hydrogen chloride concentration of said recovered aqueous hydrogen chloride; and

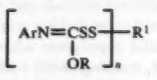
controlling at least one of the hydrogen chloride and hydrocarbon feeds to increase and decrease the proportion of hydrogen chloride to hydrocarbon in response to changes in the hydrogen chloride concentration of said recovered aqueous hydrogen chloride from a predetermined hydrogen chloride concentration to thereby maintain said predetermined hydrogen chloride concentration which corresponds to a predetermined desired hydrogen chloride to hydrocarbon feed ratio.

4,042,641
INHIBITING PREMATURE VULCANIZATION OF RUBBERS WITH N-ARYL-HYDROCARBYLDITHIO-FORMIMIDATE

John P. Lawrence, Stow, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Mar. 12, 1976, Ser. No. 666,286
Int. Cl.² C08C *11/54*; C08D *9/00*
U.S. Cl. 260—780 **10 Claims**

1. A rubber composition comprising vulcanizable diene rubber containing, in an amount effective to inhibit premature vulcanization thereof, a compound having the following structural formula



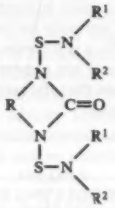
wherein Ar is an aryl radical derived from a benzenoid aromatic nucleus having 6 to 10 carbon atoms which is unsubstituted or substituted on the nucleus with one or two groups selected from the group consisting of chloro, nitro, alkyl and alkoxy groups, the alkyl and alkoxy groups containing 1 to 4 carbon atoms; wherein R is selected from the group consisting of alkyl radicals having 1 to 20 carbon atoms, cycloalkyl radicals having 5 to 20 carbon atoms and being unsubstituted or substituted with 1 or 2 alkyl radicals having 1 to 4 carbon atoms, aryl radicals having 6 to 10 carbons atoms and aralkyl radicals having 7 to 20 carbon atoms; wherein when n is 1, R^1 is selected from the same group of radicals as described for R and wherein when n is 2, R^1 is selected from the group consisting of straight chain or branched alkylene radicals having 2 to 10 carbon atoms and cycloalkylene radicals having 5 to 20 carbon atoms.

4,042,642
UREA ADDITIVES FOR SULFUR VULCANIZABLE POLYMERS

John P. Lawrence, Stow, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 266,040, June 26, 1972, Pat. No. 3,960,857.
This application Jan. 26, 1976, Ser. No. 652,438
Int. Cl.² C08C *11/60*; C08D *9/00*
U.S. Cl. 260—780 **9 Claims**

1. A sulfur vulcanizable rubber selected from the group consisting of natural rubber and synthetic homopolymers and copolymers of conjugated dienes having incorporated therein 0.25 to 10 parts by weight per 100 parts by weight of rubber of a urea having the following structural formula



wherein R is selected from the group consisting of saturated or olefinic divalent aliphatic radicals having 1 to 7 carbon atoms, saturated or olefinic divalent cyclic aliphatic radicals having 5 to 7 carbon atoms, arylene radicals having 6 to 10 carbon atoms and the radical

which together with the

radical forms a hydantoin ring wherein R^3 and R^4 are selected from the group consisting of hydrogen, alkyl radicals having 1 to 4 carbon atoms, cycloalkyl radicals having 5 to 6 carbon atoms, aralkyl radicals having 7 to 10 carbon atoms and aryl radicals having 6 to 10 carbon atoms or R^3 and R^4 can be joined to form with the attached carbon atom a hydrocarbon ring containing 5 to 6 carbon atoms, and wherein R^1 and R^2 are selected from the group consisting of alkyl radicals having 1 to 20 carbon atoms, cyanoalkyl radicals having 2 to 21 carbon atoms, cycloalkyl radicals having 5 to 20 carbon atoms, aralkyl radicals having 7 to 20 carbon atoms and aryl radicals having 6 to 20 carbon atoms and wherein R^1 and R^2 can be joined through a member of the group consisting of — CH_2 — , — O — and — S — to constitute with the attached nitrogen atom a heterocyclic ring.

4,042,643
ORGANOPOLYSILOXANE COMPOSITIONS

Norman Geoffrey Creasey, and Leslie Clark Pike, both of Manchester, England, assignors to Imperial Chemical Industries Limited, England

Filed Nov. 4, 1975, Ser. No. 628,764
Claims priority, application United Kingdom, Nov. 15, 1974, 49485/74; June 27, 1975, 27290/75
Int. Cl.[2] B32B 9/04; C08L 83/04
U.S. Cl. 428—447 13 Claims

1. A composition suitable for conferring release properties on substrates comprising 100 parts by weight of a curable linear diorganopolysiloxane, a cross-linking agent therefore and/or a catalyst therefore and 0.1 to 50 parts by weight of a copolymer of the average general formula

$$A_3SiO(Me_2SiO)_x(MeRSiO)_y(MeHSiO)_zSiA_3$$

where R is selected from (a) alkyl groups having at least four carbon atoms, alkaryl, aralkyl and cycloalkyl groups; (b) groups $-R^1-QR^2$ where R^1 is a divalent group containing at least two carbon atoms and joined to silicon by a C-Si linkage, R^2 is a monovalent hydrocarbon group and W is either oxygen or sulphur; and (c) hydrocarbonoxy groups having at least four carbon atoms and joined to silicon by a C-Si linkage, A is selected from the groups R, lower alkyl groups, phenyl groups, alkenyl groups, alkoxy groups, hydroxy groups and hydrogen, *x* and *z*, which will not normally be the same, are O or a number not greater than 950, *y* is a number from 1 to 1000, x + y + z is not less than 20 and not greater than 1000, y/(x + y + z) is not less than 0.05 and the total ratio of R:Si in the composition is not less than 1:2000.

4,042,644
PROCESS FOR PRODUCING OF POLYMERS BY CONNECTING OF POLYMERIC MOLECULES

Frantisek Hrabak; Vlasta Hynkova, both of Prague, and Jan Lokaj, Letonice by Vyskov, all of Czechoslovakia, assignors to Czechoslovenska akademie ved, Prague, Czechoslovakia

Continuation-in-part of Ser. No. 186,799, Oct. 5, 1971, abandoned. This application Aug. 17, 1972, Ser. No. 281,286
Int. Cl.[2] C08F 8/06; C08G 73/00, 85/00
U.S. Cl. 260—849 4 Claims

1. A process for connecting polymers wherein at least one of said polymers contains at least one tertiary amino group in the chain thereof comprising admixing said polymers in the presence of an oxidizing agent at ambient temperature for a period of time sufficient to cause substantial crosslinking of said polymers wherein said tertiary amino groups are present in a major proportion and the product formed is a crosslinked material.

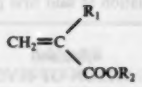
4,042,645
PROCESS FOR PRODUCING THERMOSETTING FINISHING POWDERS

Kuniomi Hirota, Kamakura; Akio Masumoto, Yokohama; Hiroshi Ozawa, Yokohama; Nobuki Kobayashi, Yokohama, and Teruo Honda, Hiratsuka, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Continuation-in-part of Ser. No. 91,197, Nov. 19, 1970, abandoned. This application Dec. 13, 1973, Ser. No. 426,954
Claims priority, application Japan, Nov. 27, 1969, 44-94624; Dec. 29, 1969, 45-988; Feb. 12, 1970, 45-11482
Int. Cl.[2] C08F 2/20, 6/00; C08L 33/04
U.S. Cl. 260—830 P 6 Claims

1. A process for producing a solid copolymer having a glass transition point of from 5° to 60° C and a number average molecular weight of from 1,500 to 30,000 which comprises copolymerizing a mixture of:

A. at least 30% by weight of total monomers of a monomer having the formula:



wherein R_1 is selected from the group consisting of H and CH_3 and R_2 is an alkyl radical containing from 1 to 14 carbon atoms;

B. a member selected from the group consisting of

1. from 3 to 20% by weight of total monomers of a monomer selected from the group consisting of ethylenic α,β unsaturated mono and dicarboxylic acids and anhydrides thereof,
2. from 3 to 40% by weight of total monomers of a monomer selected from glycidyl acrylate and glycidyl methacrylate; and

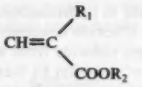
c. from 0 to 67% by weight of total monomers of an ethylenically monounsaturated monomer copolymerizable with said monomers (A) and (B),

the mixture being first bulk-polymerized until conversion to the copolymer is from 10% to 80% by weight and polymerization then being completed by suspension-polymerization in the presence of an effective amount of a polymerization initiator.

5. A thermosetting solid coating composition which comprises a powdery mixture prepared by mixing together and then crushing or grinding at a temperature of 0° to 30° C. to a powder:

a. 60 to 97% by weight of total mixture of a solid copolymer having a glass transition point of from 5° to 60° C. and a number average molecular weight of from 1,500 to 30,000 which comprises the copolymer of:

A. at least 30% by weight of total monomers of a monomer having the formula:



wherein R_1 is selected from the group consisting of H and CH_3 and R_2 is an alkyl radical containing from 1 to 14 carbon atoms;

B. from 3 to 40% by weight of total monomers of a monomer selected from glycidyl acrylate and glycidyl methacrylate; and

C. from 0 to 67% by weight of total monomers of an ethylenically monounsaturated monomer copolymerizable with said monomers (A) and (B), said solid copolymer being obtained by first bulk polymerizing said monomers until conversion to the copolymer is from 10% to 80% by weight and then completing polymerization by suspension-polymerization in the presence of an effective amount of a polymerization initiator; and

b. 40 to 3% by weight of total mixture of a cross-linking compound consisting of a compound containing in the molecule at least two radicals selected from the group consisting of carboxyl radicals and carboxylic acid anhydride radicals, said cross-linking compound being compatible with said solid copolymer when rendered molten by heating but not reacting with said solid copolymer to cause cross-linking before both said solid copolymer and said cross-linking agent are rendered molten,

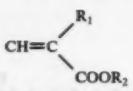
said powdery mixture being free of stickiness, high in thermal fluidity during baking when applied as a coating to a base material, and high in thermal stability, resistance to solvents, adhesion, mechanical strength and durability against weathering when it has been thermoset.

6. A thermosetting solid coating composition which comprises a powdery mixture prepared by mixing together and

then crushing or grinding at a temperature of 0° to 30° C. to a powder:

a. 60 to 97% by weight of total mixture of a solid copolymer having a glass transition point of from 5° to 60° C. and a number average molecular weight of from 1,500 to 30,000 which comprises the copolymer of:

A. at least 30% by weight of total monomers of a monomer having the formula:



wherein R_1 is selected from the group consisting of H and CH_3 and R_2 is an alkyl radical containing from 1 to 14 carbon atoms;

B. from 3 to 40% by weight of total monomers of a monomer selected from glycidyl acrylate and glycidyl methacrylate; and

C. from 0 to 67% by weight of total monomers of an ethylenically monounsaturated monomer copolymerizable with said monomers (A) and (B), said solid copolymer being obtained by first bulk polymerizing said monomers until conversion to the copolymer is from 10% to 80% by weight and then completing polymerization by suspension-polymerization in the presence of an effective amount of a polymerization initiator; and

b. 40 to 3% by weight of total mixture of a cross-linking compound consisting of a compound containing in the molecule at least two nitrogen atoms each having adjacent thereto at least one active hydrogen atom, said cross-linking compound being compatible with said solid copolymer when rendered molten by heating but not reacting with said solid copolymer to cause cross-linking before both said solid copolymer and said cross-linking agent are rendered molten,

said powdery mixture being free of stickiness, high in thermal fluidity during baking when applied as a coating to a base material, and high in thermal stability, resistance to solvents, adhesion, mechanical strength and durability against weathering when it has been thermoset.

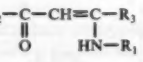
4,042,646

PROCESS FOR CURING UNSATURATED RESINS

Koji Edamura; Yoshimasa Nakagawa, and Yoshitaka Ikeda, all of Aichi, Japan, assignors to Nihon Yushi Co., Ltd., Tokyo, Japan

Filed Aug. 27, 1975, Ser. No. 608,041
Claims priority, application Japan, Sept. 2, 1974, 49-99969
Int. Cl.[2] C08L *67/06*
U.S. Cl. 260—864 **12 Claims**

1. In a process for hardening unsaturated polyester resins which comprises contacting a mixture of an unsaturated polyester resin and a vinyl monomer copolymerizable therewith, with a hardening agent, the improvement which comprises; said hardening agent is a mixture of a peroxide containing a hydroperoxy group and a β-amino-α,β-unsaturated ketone having the formula



wherein

R_1 is hydrogen, alkyl having one to 6 carbon atoms, cyanoalkyl or hydroxyalkyl having one to 6 carbon atoms, cycloalkyl having 3 to 12 carbon atoms or aralkyl,

R_2 and R_3 each are hydrogen, alkyl having one to 6 carbon atoms, cycloalkyl having 3 to 12 carbon atoms, aryl, alkoxy or amino.

4,042,647

LATEX SUSPENSION PROCESS AND GRAFT POLYBLEND COMPOSITION USING SMALL PARTICLE SIZE SPINE

Robert J. Cornell, Naugatuck, Conn., assignor to Uniroyal, Inc., New York, N.Y.

Filed Mar. 21, 1975, Ser. No. 560,988
Int. Cl.[2] C08L *25/10*
U.S. Cl. 260—880 R **9 Claims**

1. A composition consisting essentially of a polyblend of

a. a matrix of a copolymer of from about 60–80% of a monovinylidenic aromatic hydrocarbon and from about 20–40% of an ethylenically unsaturated nitrile monomer; and

b. a graft copolymer comprising a graftable rubber substrate made up of a cross-linked small particle size spine of a styrene/butadiene rubber wherein the ratio of styrene to butadiene is from about 31 to 69 to 0 to 100, and grafted onto said substrate, a superstrate which is a copolymer comprising a monovinylidene aromatic hydrocarbon and an ethylenically unsaturated nitrile, the degree of grafting, which is defined as the ratio of the weight of the grafted copolymer to the weight of the substrate, being between about 0.3 and 1.3; said substrate constituting about 5 to 45% by weight of the total composition and being in the form of particles at least 85% of which have a number average particle size less than 0.14μ, said composition being formed by suspension polymerizing said substrate with from 55–95% of at least one monoethylenically unsaturated monomer in a suspending solution in an oxygen free atmosphere at a temperature of about 105°–250° F. in the presence of a catalytically effective amount of at least one polymerization initiator selector from the group consisting of peroxide initiators and azo initiators, at least one chain transfer agent and an antioxidant.

4,042,648

OLEFIN-ACRYLIC ESTER COPOLYMER-THERMOPLASTIC RESIN COMPOSITION

Shuji Kitamura, Toyonaka; Takashi Kato, Amagasaki, and Masaaki Hirooka, Ibaragi, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed May 4, 1973, Ser. No. 357,181
Claims priority, application Japan, May 10, 1972, 47-46675
Int. Cl.[2] C08L *23/14*
U.S. Cl. 260—896 **21 Claims**

1. An olefin-acrylic ester copolymer-thermoplastic resin composition comprising

one part by weight of an aliphatic olefin-acrylic ester copolymer, said aliphatic olefin having at least three carbon atoms and

0.01 to 100 parts by weight of at least one thermoplastic resin having a modulus of elasticity of 10^3 to 10^5 kg/cm^2 at room temperature, and selected from the group consisting of crystalline vinyl resins and non-crystalline vinyl resins having a second order transition point of at least 10° C, said vinyl resins being homopolymers or copolymers of ethylene, propylene, butene-1, 4-methylpentene-1, styrene, vinyl toluene, α-methylstyrene, monochlorostyrene, vinyl chloride, vinylidene chloride, acrylonitrile, methacrylonitrile, vinyl acetate, vinyl propionate and methacrylic esters.

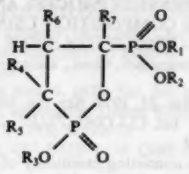
4,042,649

1,2-OXAPHOSPHOLANES

Roland A. E. Winter, Armonk, N.Y., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Sept. 18, 1975, Ser. No. 614,403
Int. Cl.[2] C07F *9/15;* **C08K** *5/53*
U.S. Cl. 260—927 R **11 Claims**

1. A compound of the formula



wherein each of R_1, R_2 and R_3 independently denotes alkyl of 1 to 18 carbon atoms; each of R_4, R_5 and R_6 independently denotes hydrogen or methyl; and R_7 denotes alkyl of 1 to 8 carbon atoms or when R_4 is methyl, R_6 is hydrogen, R_5 together with R_7 can denote 2,2-dimethyl-1,3-trimethylene.

4,042,650

CARBOXYPHOSPHONATE BRUSH CONTROL AGENTS

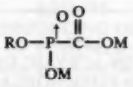
Colin Leslie McIntosh, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 590,374, June 25, 1975, which is a continuation-in-part of Ser. No. 381,619, July 23, 1973, abandoned. This application Aug. 31, 1976, Ser. No. 719,166

Int. Cl.² C07F *9/32*; A01N *9/36*

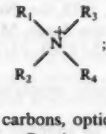
U.S. Cl. 260—924 **1 Claim**

1. A compound of the formula:

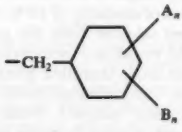


wherein

M is chosen from



R is alkyl of 1 to 8 carbons, optionally substituted with a chlorine, a bromine, a fluorine, or an iodine; alkenyl of 3 to 8 carbon atoms, or



where

A is chlorine or methyl, B is chlorine or methyl, *n* is 0 or 1, *m* is 0 or 1;

R_1 is hydrogen, alkyl of 1 to 4 carbon atoms, or hydroxyalkyl of 2 to 4 carbon atoms;

R_2 is hydrogen, alkyl of 1 to 4 carbon atoms, or hydroxyalkyl of 2 to 4 carbon atoms;

R_3 is hydrogen, alkyl of 1 to 4 carbon atoms, or hydroxyalkyl of 2 to 4 carbon atoms; and

R_4 is hydrogen or alkyl of 1 to 12 carbon atoms, provided that the total number of carbon atoms in R_1, R_2, R_3 and R_4 is less than 16.

4,042,651

SUPPORTING FRAMEWORK FOR HEAT TRANSFER SURFACES FOR COOLING TOWER

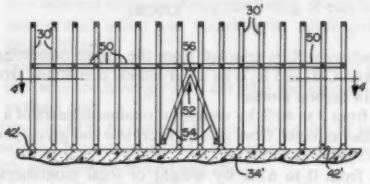
Raphael Emile Gaurois, Brussels, Belgium, assignor to Hamon Sobelco S.A., Belgium

Filed May 25, 1976, Ser. No. 689,835

Claims priority, application Luxembourg, May 28, 1975, 72596

Int. Cl.² B01F *3/04*

U.S. Cl. 261—111 **9 Claims**



1. An atmospheric cooling tower assembly comprising:

a foundation,

an upwardly extending peripheral wall defining a tower structure supported by said foundation, said wall having an air inlet opening adjacent its lower end communicating with an open upper end for the flow of atmospheric air through the tower structure,

a sump at the lower end of the tower structure below the air inlet opening,

liquid distribution pipes in said tower structure between the upper end of the air inlet and the open upper end of the tower structure,

cooling tower fill comprising heat exchange surfaces positioned below the liquid distribution pipes,

supporting framework for said heat exchange surfaces,

said supporting framework comprising a plurality of primary generally vertically directed support members extending upwardly from said sump, means hingedly interconnecting the said plurality of primary support members, further support members having stationary bearings, means connecting the said further support members to said primary support members via elastic members having a high modulus of compression and a low modulus of elasticity relative to the primary support members and said further support members forming the supporting framework.

4,042,652

METHOD FOR THE PRODUCTION OF SILICONE ELASTOMER-CONTAINING ARTICLES

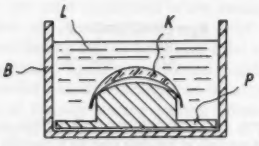
Paul Feneberg, Planegg, Germany, assignor to AGFA-Gevaert, A.G., Leverkusen, Germany

Continuation of Ser. No. 561,674, March 25, 1975, abandoned. This application Aug 24, 1976, Ser. No. 717,203

Claims priority, application Germany, Mar. 28, 1974, 2414928

Int. Cl.² B29D *11/00*

U.S. Cl. 264—1 **9 Claims**



1. In the making of contact lenses the steps of shaping a silicone elastomer lens by means of a pressure-die comprising

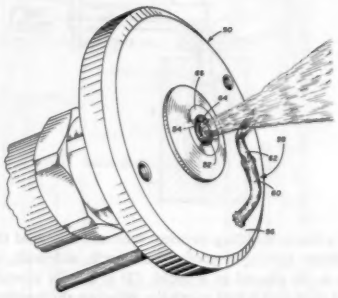
two complementary die members, the shaped lens at the end of the shaping step adhering to one of the die members, applying a swelling agent to the lens after shaping which agent is adapted to penetrate the silicone elastomer of the lens whereby the lens spontaneously separates from the said die member, thereafter removing the swelling agent from the lens so as to cause the lens to become deswollen to the shape it had adopted prior to application of said swelling agent and recovering the shaped lens.

4,042,653

PROCESS FOR SPRAY FORMING OF DISCRETE PARTICLES

Edgar Joachim Beyn, Annapolis, Md., assignor to SCM Corporation, New York, N.Y.

Filed July 31, 1974, Ser. No. 493,323
Int. Cl.[2] B01J *2/02*
U.S. Cl. 264—7 **13 Claims**



1. In a process for forming and collecting aggregate particles from a sprayable substance which comprises a fraction of normally solid particulate matter and a fraction of a fluent bonding agent in addition to the solid matter, said process including the steps of:

a. atomizing said sprayable substance into a conversion zone;

b. said sprayable substance during said atomizing step forming a pattern of droplets of various sizes including a first group of droplets of solid particulate matter and bonding agent having a droplet size within a range and a second group of droplets of finer size less than the sizes in said range;

c. establishing in said conversion zone conditions for hardening said bonding agent and forming discrete aggregates of said first group of droplets having an ostensibly dry surface, said bonding agent on hardening having sufficient strength to bond the particulate matter to form said aggregates;

the improvement comprising:

1. intercepting said pattern of droplets with a spray of an auxiliary fluent binder also hardenable under conditions of the conversion zone;

2. maintaining said auxiliary binder and said pattern of droplets in an agitated state to mutually engage said second group of droplets of finer size and said auxiliary binder prior to hardening of the auxiliary binder forming additional aggregates of said second group of droplets of finer size and said auxiliary binder; and

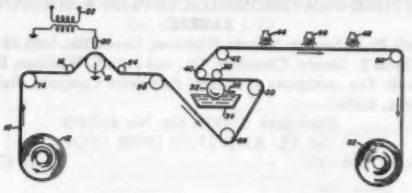
3. removing said resulting aggregates from said zone.

4,042,654

MANUFACTURE OF PLASTIC PARTS BY RADIATION MOLDING

Gerald M. Leszyk; Edward D. Morrison, and Robert F. Williams, Jr., all of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 13, 1975, Ser. No. 558,031
Int. Cl.[2] B29C *13/04*
U.S. Cl. 264—22 **15 Claims**



14. A method of making plastic parts which is especially adapted to the manufacture of small thin parts of complex shape having precise tolerances, said method comprising the steps of:

1. advancing a polymeric web into a casting zone,

2. casting onto the surface of said web within said casting zone a succession of discrete bodies of a viscous composition which is radiation-curable to a solid plastic without undergoing significant shrinkage, said discrete bodies having a predetermined shape corresponding to the shape of the plastic part which it is desired to form and a thickness in the range of from about 2 to about 20 mils, and said viscous composition having a viscosity in the range from about 200 to about 10,000 centipoises whereby said discrete bodies maintain the shape in which they are cast while supported only by said web during subsequent travel of said web,

3. advancing said web bearing said discrete bodies of radiation-curable composition into a curing zone while maintaining said discrete bodies in the shape in which they were cast,

4. irradiating said discrete bodiesof radiation-curable composition within said curing zone to effect curing of said composition and form thereby solid plastic bodies having the desired shape and precise tolerances which are strippable from said web,

5. withdrawing said web bearing said discrete bodies of solid plastic from said curing zone, and

6. stripping said discrete bodies of solid plastic from said web to thereby obtain the desired plastic part.

15. A method of making plastic parts which is especially adapted to the manufacture of small thin part of complex shape having precise tolerances, said method comprising the steps of:

1. advancing a polymeric web into a casting zone,

2. casting onto the surface of said web within said casting zone a succession of discrete bodies of a viscous composition which is radiation-curable to a solid plastic without undergoing significant shrinkage, said discrete bodies have a predetermined shape corresponding to the shape of the plastic part which it is desired to form and a thickness in the range of from about 2 to about 20 mils, and said viscous composition having a viscosity in the range from about 200 to about 10,000 centipoises whereby said discrete bodies maintain the shape in which they are cast while supported only by said web during subsequent travel of said web,

3. advancing said web bearing said discrete bodies of a radiation-curable composition into a curing zone while maintaining said discrete bodies in the shape in which they were cast,

4. irradiating said discrete bodies of radiation-curable composition within said curing zone to effect curing of said composition and form thereby solid plastic bodies having

the desired shape and precise tolerances which are bonded to said web,

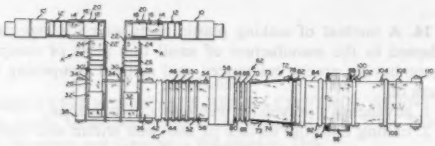
5. withdrawing said web bearing said discrete bodies of solid plastic from said curing zone, and
6. cutting said web into portions each of which includes at least one of said discrete bodies of solid plastic to thereby obtain the desired plastic part.

4,042,655

METHOD FOR THE PRODUCTION OF A NONWOVEN FABRIC

Louis Platt, Seneca; Marvin Wishman, Greenville, both of S.C.; David R. Gentry, Chamblee, Ga., and Jake E. Williams, Rockwall, Tex., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sept. 5, 1975, Ser. No. 610,899
Int. Cl.² B29D *27/00*; D04H *18/00*
U.S. Cl. 264—25 **13 Claims**



1. A method for the production of a nonwoven fabric comprising, in combination, the steps of:

a. forming a batt comprising staple fibers wherein said staple fibers are positioned primarily in a first direction;
b. passing said batt to a first drafting zone;
c. drafting said batt in said first drafting zone in a second direction, said second direction being primarily perpendicular to said first direction;
d. needling said drafted batt;
e. drafting said needled batt in a second drafting zone in said second direction; and
f. drafting said batt in a third drafting zone in said first direction.

4,042,656

GRAPHITE-BASE FILLING MATERIAL FOR THE DECOMPOSITION OF ALKALI METAL AMALGAMS AND METHOD OF PRODUCING SAME

Vladimir Petrovich Chviruk, ulitsa Tampere, 1, kv. 79; Nina Vasilievna Koneva, prospekt Nauki, 142/1, korpus 14, kv. 35/7; Alexandr Afanasievich Kilkinov, ulitsa Nikolaya Lebedeva, 3, kv. 38, all of Kiev; Alexandr Viktorovich Demin, ulitsa Pljuscheva, 18, korpus 2, kv. 105; Nikolai Nikolaevich Shipkov, ulitsa Moldogulovoi, 18, korpus 2, kv. 157, both of Moscow; Konstantin Alexeevich Kosinsky, ulitsa Uritskogo, 8, kv. 29, Ljubertsy; Georgy Mikirtychevich Kamarian, Kotelnicheskaya naberezhnaya, 25, korpus 8, kv. 45, Moscow; Ernest Elizarovich Nemirovsky, Zeleny prospekt, 11-a, kv. 19, Moscow, and Igor Nikolaevich Samokhin, I Vladimirskaya, 8, kv. 7, Moscow, all of U.S.S.R.

Filed Apr. 21, 1975, Ser. No. 569,618
Int. Cl.² B29C *25/00*
U.S. Cl. 264—29.5 **10 Claims**

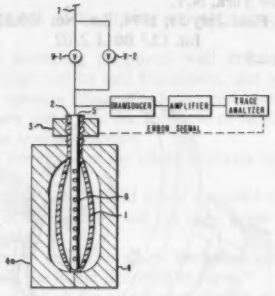
1. A method of producing a graphite-base filling material for the decomposition of alkali metal amalgams and containing between 69 and 35 weight percent of graphite and between 31 and 65 weight percent of titanium carbide, comprising forming a mixture at a temperature of about 100° C containing a carbon filler in powder form, selected from the group consisting of petroleum coke, shale coke, and graphite, and in an amount ranging between 15 and 45.2 weight percent, a carbon-containing binding agent selected from the group consisting of coal pitch, petroleum pitch, and phenol-formaldehyde resin in an amount ranging between 18 and 30 weight percent, and a titanium substance selected from the group consisting of titanium, titanium carbide, and titanium oxide, said titanium substance being in the form of a powder having a particle size of about from 40 to 250 microns and being employed in an amount ranging between 24.8 and 52.0 weight percent based on the amount of titanium present, moulding the resulting mixture into blanks of a desired size and shape, firing the thus-moulded blanks at a temperature of about from 500° to 1200° C for a period of time between 30 and 400 hours, and graphitizing the resulting fired blanks at a temperature of about from 1700° to 1800° C for a period of time between 10 and 50 hours.

4,042,657

PROCESS FOR THE AUTOMATIC INSPECTION OF BLOW-MOLDED ARTICLES

George Joseph Ostapchenko, Wilmington, Del., and Terrance Duane Phillips, Aiken, S.C., assignors to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Filed Feb. 20, 1976, Ser. No. 659,934
Int. Cl.² B29C *17/07*
U.S. Cl. 264—40.1 **6 Claims**



1. In a blow-molding process wherein a heated thermoplastic preform having a prefinished neck, sidewall, and closed bottom is (1) placed in a mold, (2) is axially stretched by an inserted mandrel while partially inflating the preform, and (3) is then completely inflated against the mold under increased pressure to form a hollow thermoplastic article, the improvement wherein the hollow thermoplastic article is produced while

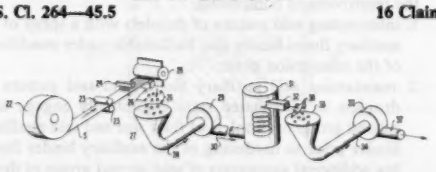
a. measuring fluid pressure variations in the preform as it is inflated,
b. comparing the measured fluid pressure variations with a standard pressure trace representative of commercial quality, hollow thermoplastic articles, and
c. rejecting hollow thermoplastic articles having fluid pressure measurements which deviate substantially from the standard pressure trace.

4,042,658

METHOD FOR MAKING PACKAGING PARTICLES AND RESULTING PRODUCT

Frederick H. Collins, Thousand Oaks, Calif., assignor to Valcour Imprinted Papers, Inc., Glens Falls, N.Y.

Filed Nov. 14, 1975, Ser. No. 632,073
Int. Cl.² B29D *27/00*
U.S. Cl. 264—45.5 **16 Claims**



1. Method of making foamed, distorted sheet particles suit-

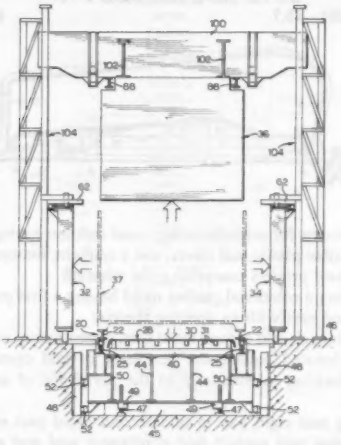
able for use as packaging particles from an extrudable, expandable synthetic plastic material capable of being oriented upon stretching, comprising, extruding a foamed sheet of said material while orienting said sheet and chilling one surface thereof more rapidly than the other surface thereof as it is extruded to form thereon an integral skin of higher density material on said one surface than on said other surface and the remaining portions of said sheet, said foamed sheet comprising a foamed portion and said skin; cutting said sheet into a plurality of smaller sheet-like pieces; and subjecting said smaller pieces to heat at a foaming temperature to cause further expansion of said foamed portion and shrinkage of said skin to result in distortion of said pieces to form a curved configuration.

4,042,659

METHOD OF MOLDING MODULAR BUILDINGS

Alden Joseph Botting, 97 Westhumber Boulevard, Rexdale, Ontario; John Michael Mulcahy, 1500 Eglinton Avenue W., Apt. 409, and William James Hannah, 376 O'Connor Drive, both of Toronto, Ontario, all of Canada

Filed May 6, 1974, Ser. No. 467,365
Int. Cl.[2] B28B *1/08, 1/10*
U.S. Cl. 264—71 **5 Claims**



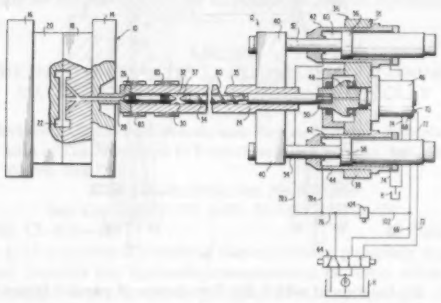
1. A method of manufacturing a monolithic reinforced concrete modular building unit comprising the steps: horizontally moving and introducing a steel reinforcing mesh assembly supported on a pallet to a moulding position between an upwardly retracted closed-bottom interior core, adapted to be vertically reciprocal with a pair of opposed exterior end walls, and a downwardly retracted exterior mould floor; elevating said mould floor vertically upwardly into tight abutment with the pallet and extending said interior core vertically downwardly towards said floor mould into rigid alignment and near abutment therewith for defining a floor space therebetween, said end walls moving vertically downwardly with said core; extending said pair of opposed exterior end walls horizontally inwardly towards each other into tight abutment with the pallet and into near abutment with the core for defining end wall spaced therebetween; extending a pair of opposed exterior side walls horizontally towards each other into tight abutment with the pallet and into near abutment with the core for defining side wall spaces therebetween, said floor space and said end and side wall spaces forming a continuous moulding cavity; introducing concrete into the moulding cavity; permitting said concrete to partially cure; retracting the opposed mould end and side walls outwardly from each other, retracting the interior core vertically upwardly with the said retracted end walls, and retracting the mould floor downwardly from the partially cured concrete; and removing the resulting building unit on the pallet from the moulding position.

4,042,660

MOTTLED APPEARANCE INJECTION MOLDING METHODS

Thomas G. Bishop, Mount Gilead, Ohio, assignor to HPM Corporation, Mount Gilead, Ohio

Division of Ser. No. 382,500, July 25, 1973, Pat. No. 3,945,786. This application Jan. 14, 1976, Ser. No. 649,063
Int. Cl.[2] B29F *1/12*
U.S. Cl. 264—77 **1 Claim**



1. A method of molding an article of mottled appearance comprising the steps of:

introducing molding materials of different coloration into an injector housing bore containing a rotatable screw;

rotating said screw to advance said materials and discharge said materials from said screw in a softened condition which is short of a fully blended condition so that distinct color patterns are present;

heating a portion of said housing located ahead of said screw;

translating said screw forwardly to advance said softened materials toward said heated housing portion containing a spreader, so that the softened materials are spread outwardly and travel through a passage formed by said spreader in a direction parallel to the axis of said bore to facilitate melting and minimize mixing of said materials;

discharging said materials from a discharge opening of said housing in a fully melted condition but short of a fully mixed condition, so that distinct color patterns are present.

4,042,661

METHOD AND APPARATUS FOR FORMING TUBULAR MULTILAMINATE PLASTIC FILM

Stephen Olney Cook, Mill Valley, Calif., assignor to Crown Zellerbach Corporation, San Francisco, Calif.

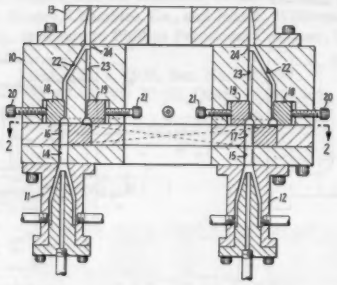
Filed Jan. 23, 1976, Ser. No. 651,983
Int. Cl.[2] B29F *3/10*
U.S. Cl. 264—173 **1 Claim**

1. A method of producing a tubular plastic film having four or more resin layers comprising

a. combining at least two resin streams into a first stream of parallel layers of the resins and continuously feeding said first stream into a first annular space without compressing the stream in a direction perpendicular to the plane of the layers such that the first stream divides into two substreams which flow in opposite directions about the axis of the annular space and then join to form a first annular stream in which the layers are coaxial, the height of each substream being reduced as it flows through the annular space,

b. combining the other resin streams into a second stream of parallel layers of the resins and continuously feeding the

second stream into a second annular space substantially concentric with the first annular space without compressing the stream in a direction perpendicular to the plane of the layers such that the stream divides into two substreams which flow in opposite directions about the axis of the second annular space and then join to form a second annular stream in which the layers are coaxial, the height of each substream being reduced as it flows through the annular space, the second stream of parallel layers being fed into the second annular space at a location offset from



the location at which the first stream of parallel layers is fed into the first annular space,

c. regulating the flow of the first annular stream from the first annular space and, independently, regulating the flow of the second annular stream from the second annular space,

d. combining the first and second annular streams into a composite annular stream, and

e. expressing the composite stream through an annular orifice to form the tubular film.

4,042,662

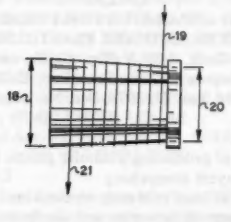
CONTINUOUS MELT SPINNING AND DRAWING OF NYLON 6 YARN, WHILE REDUCING THE LIVELINESS OF THE YARN

Thomas F. Corbin, Jr.; Brewster B. Eskridge, and Boyce M. Lyon, all of Asheville, N.C., assignors to Akzona Incorporated, Asheville, N.C.

Continuation of Ser. No. 36,743, May 13, 1970, abandoned. This application Mar. 18, 1974, Ser. No. 452,041

Int. Cl.² B29C *25/00;* D01F *6/60;* D06M *15/12*

U.S. Cl. 264—210 F **2 Claims**



1. A process for continuously melt spinning and drawing nylon 6 to form a yarn comprising the steps of melt extruding said yarn, applying an aqueous emulsion finish to said yarn immediately after extrusion, thereby causing lengthening of and liveliness in said yarn, passing said yarn while in an undrawn state through at least two stages of a substantially unheated winding zone, increasing the rate of speed of the yarn at least between the first and second stages of passage within said winding zone an amount sufficient to compensate for said yarn lengthening and to thereby reduce the yarn liveliness resulting therefrom, and drawing said yarn away from the last stage of said winding zone.

4,042,663

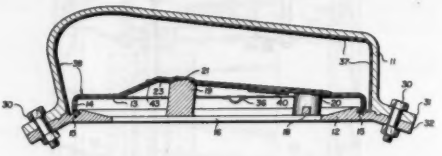
MONOLITHIC SEAT CUSHION AND METHOD FOR PRODUCING SAME

Arthur J. Harder, Jr., Franklin Park, Ill., assignor to Coach and Car Equipment Corporation, Elk Grove Village, Ill.

Filed Dec. 16, 1974, Ser. No. 533,253

Int. Cl.² B29C *5/07;* B29D *27/04*

U.S. Cl. 264—45.7 **6 Claims**



1. A process for manufacturing a seat cushion having a rigid pan, a flexible plastic seat cover, and a resilient, foamed plastic interior, said process comprising the steps of:

providing a rotational casting mold having a first part and a second part with an opening therein;

providing, on said second mold part, a continuous, elongated seal located outside the periphery of said opening and conforming substantially to the periphery of said rigid pan;

placing said rigid pan in said second mold part over said opening and against said continuous seal and engaging said pan with said continuous seal along the periphery of said pan;

assembling said first mold part, said second mold part and said pan to define a closed mold cavity at least one wall of which is at least partly defined by said pan;

introducing, into said cavity, rotationally castable raw plastic material for said flexible plastic seat cover;

heating and rotating said mold, with said raw plastic material within the mold, to form a closed, hollow seat cushion shell having at least one wall defined at least in part by said rigid pan and having its remaining wall portions composed of said flexible plastic material rotationally cast integral with said pan;

said last recited step comprising bonding said flexible plastic wall parts integrally with said rigid pan along the periphery of said pan adjacent said continuous seal;

holding said pan against said seal during said heating and rotating steps to prevent leakage of said plastic material outside said mold cavity at the periphery of said pan;

introducing, into said hollow cushion shell, unfoamed ingredients capable of foaming to produce said resilient, foamed plastic interior;

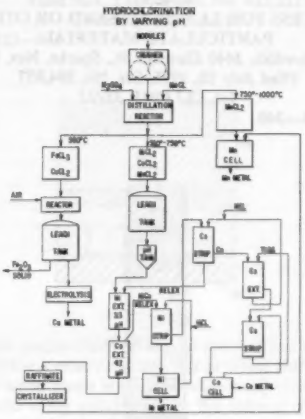
and foaming said last recited ingredients within said shell to completely fill the shell's interior with resilient foamed plastic.

4,042,664

METHOD FOR SEPARATING METAL CONSTITUENTS FROM OCEAN FLOOR NODULES

Paul H. Cardwell, Zanoni, and William S. Kane, Wicomico, both of Va., assignors to Deepsea Ventures, Inc., Gloucester Point, Va.

Continuation of Ser. No. 247,554, April 26, 1972, Pat. No. 3,950,486, which is a continuation-in-part of Ser. No. 40,564, May 26, 1970, abandoned, which is a continuation-in-part of Ser. No. 40,565, May 26, 1970, abandoned, which is a continuation-in-part of Ser. No. 40,587, May 26, 1970, abandoned, which is a continuation-in-part of Ser. No. 40,590, May 26, 1970, abandoned, which is a continuation-in-part of Ser. No. 40,730, May 26, 1970, abandoned, which is a continuation-in-part of Ser. No. 184,770, Sept. 29, 1971, abandoned, which is a continuation-in-part of Ser. No. 142,697, May 12, 1971, Pat. No. 3,752,745, which is a continuation-in-part of Ser. No. 184,771, Sept. 29, 1971, Pat. No. 3,773,635. This application June 11, 1975, Ser. No. 586,139
The portion of the term of this patent subsequent to Aug. 14, 1990, has been disclaimed.
Int. Cl.[2] C01G *3/04, 51/08, 53/08, 45/06*
U.S. Cl. 423—24 24 Claims



1. A process for the recovery of pure metal halides from ocean floor nodule ore, the ore comprising, as major components, the oxides of manganese and iron and as secondary components, compounds of copper, cobalt and nickel, the weight ratio of manganese-to-nickel-plus cobalt being at least about 9, the process comprising the steps of (1) reacting the nodule ore with a halide salt-forming reagent, selected from the group consisting of hydrogen halides and combinations of an elemental halogen with a selective reducing reagent, to form a mixture comprising the corresponding water-soluble halide salts of divalent manganese, trivalent iron, copper, nickel and cobalt, the reducing reagent being selected from the group consisting of carbon, hydrocarbons and carbon monoxide; (2) converting the ferric halide to water-insoluble ferric oxide; (3) dissolving the remaining metal halide salts in water to form an iron-free pregnant aqueous solution of the water-soluble halides, containing concentration of manganese and concentration of nickel, cobalt plus copper proportional to the concentrations in the nodule ore and separating the solution from the insoluble ferric oxide; and (4) contacting the pregnant aqueous solution with a water-immiscible organic extracting solution comprising an extraction agent selective for copper and selected from the group consisting of alpha-hydroxyoximes and hydrocarbon-substituted-8-hydroxy quinolines, the aqueous solution having a pH not greater than about 2.5.

4,042,665

COBALT ION EXCHANGE PROCESS

William Ronald Hatch, Bolton, Canada, assignor to Falconbridge Nickel Mines Limited, Toronto, Canada

Filed Sept. 27, 1976, Ser. No. 726,994
Int. Cl.[2] C22B *23/04*
U.S. Cl. 423—139 22 Claims

1. A method of recovering cobalt from ammoniacal solution comprising bringing the solution into contact with carbonaceous material, the solution redox potential being in the range +20 to −150 mV as measured by a platinum-calomel standard electrode pair, extracting the cobalt from the leach solution with a cationic ion exchange reagent, and, recovering substantially all the cobalt from the ion exchange reagent by elution.

4,042,666

METHOD OF TREATING PHOSPHATE-CONTAINING MATERIAL TO REDUCE PROBLEM WITH CLAY SWELLING

Herbert L. Rice, Fort Worth, and Roy A. Wilkins, Arlington, both of Tex., assignors to Petrochemicals Company, Inc., Fort Worth, Tex.

Filed Feb. 2, 1976, Ser. No. 654,185
Int. Cl.[2] C01F *1/00, 5/00, 11/00;* C22B *26/20*
U.S. Cl. 423—167 23 Claims

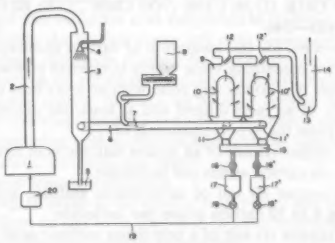
1. In a process for treating clay-containing phosphate rock that includes the hydraulic transportation of finely divided phosphate rock wherein the phosphate rock is prepared in the form of an admixture of the phosphate rock in an aqueous slurry for handling; the improvement comprising the step of adding to said admixture a chemical selected from the class consisting of an aliphatic hydroxy acid containing 2–6 carbon atoms, inclusive; a water-soluble, inorganic salt of said aliphatic acid; and a blend of one of said aliphatic hydroxy acid and said salt of said aliphatic hydroxy acid with an alkali metal hydroxide; said chemical being added in at least an amount effective to reduce viscosity of said admixture at a predetermined time interval after addition below the viscosity of said admixture alone and such that said admixture can be pumped after 4 hours storage at concentrations of solids therein in excess of 65 percent by weight.

4,042,667

METHOD OF CLEANING WASTE GAS CONTAINING A FLUORINE COMPONENT

Shosuke Ishiwata, Ibaragi, and Kaoru Ozaki, Chigasaki, both of Japan, assignors to Asahi Fiber Glass Company Limited, Tokyo, Japan

Filed Apr. 17, 1975, Ser. No. 569,144
Int. Cl.[2] B01D *53/34*
U.S. Cl. 423—240 26 Claims



1. In a method of cleaning a fluorine-containing waste gas evolved from a furnace, by contacting said gas with a fluorine-reactive powder and filtering the fluorine-reactive powder by a filter, an improvement which comprises cooling the waste gas to 150°–400° C with a water spray;

feeding a fluorine-reactive powder into the cooled waste gas;

passing the cooled waste gas through a filter on which the fluorine-reactive powder is deposited so as to react with the fluorine component of the waste gas; and

removing the deposited powder layer from the filter.

4,042,668

SO_2 REMOVAL PROCESS

Jean Louis Balmat, Kennett Square, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 15, 1975, Ser. No. 622,749

Int. Cl.[2] C01B *17/00, 17/72, 17/68*

U.S. Cl. 423—243 **8 Claims**

1. A process for the removal of SO_2 from an oxygen-containing gas stream comprising contacting the gas stream with liquid water containing dispersed therein a catalytic amount of a chelate of manganese^{+2} and a β-diketone whereby the SO_2 is oxidized to SO_3 which is absorbed into the water thus forming sulfuric acid, the concentration of sulfuric acid dissolved in the water being less than about 40% by weight, basis total solution, and the β-diketone corresponding to the structure

$$R_1-\overset{O}{\overset{\|}{C}}-R_2-\overset{O}{\overset{\|}{C}}-CH_3, \text{ in which}$$

in which R_1 is a $C_{1\text{-}10}$ hydrocarbyl radical selected from the group consisting of alkyl, cycloalkyl, aryl, aralkyl, alkaryl and $C_{2\text{-}4}$ alkylene which when covalently bonded to a carbon atom from R_2 forms a cycloalkyl ring and R_2 is a bivalent hydrocarbyl radical selected from the group consisting of methylene and ethylidene and separating the unabsorbed gas from the absorbent.

4,042,669

PROCESS FOR SEPARATION AND RECOVERY OF CARBON MONOXIDE

Marvin M. Johnson, and Donald C. Tabler, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 1, 1975, Ser. No. 618,721

Int. Cl.[2] C01B *31/18;* **C10K** *1/00;* **C01B** *21/00;* **B01D** *19/00*

U.S. Cl. 423—246 **22 Claims**

1. A process for the separation of carbon monoxide from a gas mixture containing same which comprises contacting said gas mixture in a contacting zone with an absorbent consisting essentially of an inert diluent and at least one copper (I) salt selected from the group consisting of:

a. the copper (I) salt of an alkane sulfonic acid having from 4 to 20 carbon atoms per molecule;

b. the copper (I) salt of an aromatic sulfonic acid having from 6 to 22 carbon atoms per molecule;

c. the copper (I) salt of a petroleum sulfonic acid; and

d. the copper (I) salt of a dialkyl phosphate having from 1 to 12 carbon atoms per alkyl member, said copper (I) salt being present in said diluent in an amount sufficient to complex at least a portion of said carbon monoxide in said gas mixture, and said diluent being a normally liquid hydrocarbon having a boiling point in the range of 60°–150° C.

4,042,670

PROCESS OF MAKING OXYGEN ENRICHED PLUTONIUM DIOXIDE (PuO_2)

Owen Lee Kruger, Columbus, Ohio, assignor to Nuclear Battery Corporation, Columbia, Md.

Continuation of Ser. No. 303,085, Nov. 2, 1972, abandoned. This application Oct. 1, 1974, Ser. No. 511,089

Int. Cl.[2] C01G *56/00;* **C09K** *3/00*

U.S. Cl. 423—251 **9 Claims**

1. Process for enriching $^{238}PuO_2$ with ^{16}O and forming sintered fuel pellets therefrom comprising

1. compressing a mass of $^{238}PuO_2$ into a pellet, the oxygen atoms of the $^{238}PuO_2$ mass having a natural distribution of the ^{16}O, ^{17}O and ^{18}O isotopes;

2. exposing said pellet to an atmosphere of oxygen enriched in the ^{16}O isotope and an inert carrier gas and gradually heating said pellet to a temperature of about 1400° C to obtain an exchange of ^{17}O and ^{18}O by ^{16}O and the simultaneous sintering of said pellet; and

3. cooling said sintered and exchanged pellet.

4,042,671

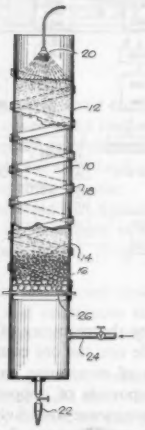
PROCESS FOR LEACHING SAND OR OTHER PARTICULATE MATERIAL

Frank W. Bowdish, 2440 Eleventh St., Sparks, Nev. 89431

Filed July 10, 1975, Ser. No. 594,857

Int. Cl.[2] C01B *33/12*

U.S. Cl. 423—340 **15 Claims**



1. A process for leaching iron and other metallic compounds from sand with a series of aqueous solutions of differing compositions differing in concentrations of leaching component in the form of an acid, in which the aqueous solutions are fed to the top of the mass of the sand and permitted to drain through gravitationally with appropriate periods of time between solutions for reaction, said solutions of differing compositions forming series which begin with solutions low in concentration of the leaching component and continue with solutions of higher concentration of the leaching component until the solution of highest strength in the series has been reached at about midway through the leaching operation, after which solutions of progressively lower concentrations follow until the series of solutions terminate with one low in concentration of the leaching component, ending with a wash water, said solutions, except for the wash water, being made up largely of the drainage from a previous batch leach, to some of which leaching component is added to increase the concentration.

4,042,672
PROCESS FOR PREPARING CARBONATED ZIRCONIUM OXIDE HYDRATE

Wilhelm Brugger, Hosel, and Ekkehard Greinacher, Essen, both of Germany, assignors to Th. Goldschmidt AG, Germany

Filed Sept. 12, 1975, Ser. No. 612,855
Claims priority, application Germany, Oct. 30, 1974, 2451489
Int. Cl.[2] C01B *31/24*; C01G *25/00*
U.S. Cl. 423—419 R 4 Claims

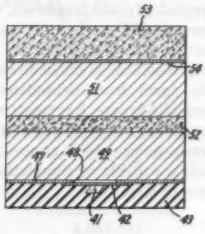
1. A process for preparing carbonated zirconium oxide hydrate which comprises adding zirconium oxychloride · 8 H_2O to a saturated aqueous ammonium chloride and/or alkali chloride solution which, based upon zirconium oxychloride · 8 H_2O, contains at least equimolecular amounts of ammonium carbonate and/or alkali carbonate,

separating the resulting precipitated reaction product, and washing said product chloride-free with water.

4,042,673
NOVEL DIAMOND PRODUCTS AND THE MANUFACTURE THEREOF

Herbert M. Strong, Schenectady, N.Y., assignor to General Electric Company, Columbus, Ohio

Filed Nov. 2, 1973, Ser. No. 412,332
Int. Cl.[2] C01B *31/06*
U.S. Cl. 423—446 17 Claims



1. A high quality diamond crystal symmetrical about a cube axis displaying a relatively colorless or white pair of three-dimensional linear bands in crossed relationship when said crystal is viewed along said cube axis, the balance of the crystal contiguous with said bands having a blue color due to the presence of boron, the overall pattern being symmetrical.

5. In a reaction vessel for introduction into the reaction volume of a high pressure, high temperature apparatus, said reaction vessel constituting an assembly of interfitting elements for enclosing at least one diamond seed and a source of substantially pure carbon separated by a mass of metallic catalyst-solvent for the diamond-making reaction disposed therebetween so as to provide a predetermined temperature gradient between said diamond seed and said source of carbon under operating conditions of pressure and temperature in the diamond stable region of the phase diagram of carbon, said diamond seed and said source of carbon being located in separate regions of said reaction vessel such that under said operating conditions said diamond seed will be at a temperature near the minimum value of temperature for said temperature gradient and simultaneously said source of carbon will be at a temperature near the maximum value of temperature for said temperature gradient, the improvement comprising:

a. a layer of isolating material disposed in contact with the diamond seed and between said diamond seed material and the mass of catalyst-solvent material, said isolating material being selected from the group consisting of platinum, molybdenum, titanium, tantalum, tungsten, iridium, osmium, rhodium, palladium, vanadium, ruthenium, chromium, hafnium, rhenium, niobium and zirconium and alloys thereof and in any given reaction vessel construction said isolating material having a melting point, when in contact with diamond, that is higher than the melting point of the metallic catalyst-solvent saturated with carbon dissolved therein when in contact with diamond,

b. the interfitting element additionally enclosing a concentration of boron and a concentration of aluminum, said boron and aluminum concentrations being, respectively, in excess of about 1 ppm and about 2500 ppm of the weight of the catalyst-solvent, and

c. said diamond seed having a cube face exposed to and in contact with said layer of isolating material.

4,042,674
PROCESS FOR TREATING THE MOTHER LIQUOR BY COOLING IN THE PRODUCTION OF ANHYDROUS SODIUM DITHIONITE

Kousuke Yamamoto; Shinji Takenaka, and Kazuo Maeda, all of Ohmuta, Japan, assignors to Mitsui Toatsu Chemicals Inc., Tokyo, Japan

Filed May 18, 1976, Ser. No. 687,447
Claims priority, application Japan, May 21, 1975, 50-59570
Int. Cl.[2] C01B *17/66*
U.S. Cl. 423—515 10 Claims

1. In the process for the production of anhydrous sodium dithionite by reacting sodium formate, an alkaline sodium compound and sulfurous acid anhydride in hydrous methanol and recycling the mother liquor left after separation of anhydrous sodium dithionite product from the reaction mixture to the production of anhydrous sodium dithionite be said reaction between sodium formate, an alkaline sodium compound, an sulfurous acid anhydride in hydrous methanol, said mother liquor containing acid sodium sulfite, sodium thiosulfate, sodium formate, methanol and water the improvement comprising:

1. cooling the mother liquor after said separation to a temperature in the range of $+5°$ to $-30°$ C to precipitate sodium thiosulfate,
2. removing the precipitated thiosulfate by filtration, and
3. recycling the filtrate to said production of anhydrous sodium dithionite.

4,042,675
PROCESS FOR TREATING THE MOTHER LIQUOR BY pH ADJUSTING IN THE PRODUCTION OF ANHYDROUS SODIUM DITHIONITE

Kousuke Yamamoto; Shinji Takenaka; Kazuo Maeda, and Michio Mituta, all of Ohmuta, Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed May 18, 1975, Ser. No. 687,448
Claims priority, application Japan, May 21, 1975, 50-59569
Int. Cl.[2] C01B *17/66*
U.S. Cl. 423—515 10 Claims

1. In the process for the production of anhydrous sodium dithionite by reacting sodium formate, an alkaline sodium compound and sulfurous acid anhydride in hydrous methanol and recycling the mother liquor left after separation of anhydrous sodium dithionite product from the reaction mixture to the production of anhydrous sodium dithionite, by said reaction between sodium formate, an alkaline sodium compound and sulfurous acid anhydride in hydrous methanol, said mother liquor containing acid sodium sulfite, sodium thiosulfate, sodium formate, methanol and water

the improvement comprising

1. adding an alkali to the mother liquor after said separation to adjust its pH to at least 8 to thereby coprecipitate sodium sulfite and sodium thiosulfate;
2. separating the coprecipitate solids by filtration;
3. oxidizing the resulting filtrate at a temperature of 20° to 60° C with an oxidizing agent selected from the group consisting of sodium hypochlorite, chlorine, ozone and hydrogen peroxide in an amount sufficient to oxidize sodium sulfite and sodium thiosulfate dissolved in the filtrate into sodium sulfate; and

4. recycling the oxidized filtrate to said production of anhydrous sodium dithionate.

10. In the process for the production of anhydrous sodium dithionite by reacting sodium formate, an alkaline sodium compound and sulfurous acid anhydride in hydrous methanol and recycling the mother liquor left after separation of anhydrous sodium dithionite product from the reaction mixture to the production of anhydrous sodium dithionite by said reaction between sodium formate, an alkaline sodium compound and sulfurous acid anhydride in hydrous methanol, said mother liquor containing acid sodium sulfite, sodium thiosulfate, sodium formate, methanol and water

the improvement comprising

1. adding an alkali to the mother liquor after said separation to adjust its pH to at least 8 to thereby coprecipitate sodium sulfite and sodium thiosulfate;
2. separating the coprecipitate solids by filtration;
3. oxidizing the resulting filtrate at a temperature of 20° to 60° C with an oxidizing agent selected from the group consisting of sodium hypochlorite, chlorine, ozone and hydrogen peroxide in an amount sufficient to oxidize sodium sulfite and sodium thiosulfate dissolved in the filtrate into sodium sulfate;
4. distilling the entire oxidized filtrate from step (3) to distill out and recover methanol;
5. thereafter further concentrating the distillation residue by distillation under reduced pressure to crystallize out and recover sodium formate; and,
6. recycling the recovered methanol and sodium formate to said production of anhydrous sodium dithionite.

4,042,676

TECHNETIUM-99m LABELED RADIODIAGNOSTIC AGENTS FOR LIVER AND BONE MARROW SCANNING AND METHOD OF PREPARATION

Victor Joseph Molinski, Ridgewood, N.J., and Frank Raymond Peacock, Newburgh, N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Oct. 9, 1975, Ser. No. 621,087
Int. Cl.[2] A61K *29/00, 43/00*
U.S. Cl. 424—1 **24 Claims**

1. A stable, non-radioactive carrier suitable for liver scanning when labeled with ^{99m}Tc, said carrier comprising sodium phytate; and stannous ion chelated with oxalate, the ratio by weight of said phytate to chelate being at least about 1 to 1.

22. A radiodiagnostic agent suitable for liver scanning and having a pH between about 3 and about 7, said agent comprising sodium phytate; stannous ion chelated with oxalate, and a saline solution of $Na^{99m}TcO_4$, the ratio by weight of said phytate to said chelate being at least about 1 to 1.

4,042,677

TECHNETIUM-99M LABELED RADIODIAGNOSTIC AGENTS AND METHOD OF PREPARATION

Victor Joseph Molinski, Ridgewood, N.J., and Joseph Arthur Wilczewski, Newburgh, N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 501,704, Aug. 29, 1974, Pat. No. 3,987,157. This application Dec. 1, 1975, Ser. No. 636,372
Int. Cl.[2] A61K *29/00, 43/00;* **G01T** *1/161;* **G21H** *5/02*
U.S. Cl. 424—1 **19 Claims**

1. A stable, non-radioactive carrier suitable for cardiac studies, blood pool and brain scanning when labeled with ^{99m}TC, said carrier comprising human serum albumin (HSA) and strannous tartrate, the ratio by weight of said HSA to stannous tartrate being between about 50 to 1 and about 150 to 1.

18. A radiodiagnostic agent suitable for cardiac studies, blood pool and brain scanning and having a pH between about 2 and about 4, said agent comprising a mixture of stannous tartrate, human serum albumin and a saline solutin of $Na^{99m}TcO_4$, the ratio by weight of said human serum albumin to said stannous tartrate being between about 50 to 1 and about 150 to 1.

4,042,678

WATER-SOLUBLE AGENTS HAVING MITOGENIC PROPERTIES OBTAINED FROM NOCARDIA CELLS, AND PROCESSES FOR THE PREPARATION THEREOF

Rita, born Sfartz Ciorbaru, Fontenay aux Roses; Arlette, born Chosson Adam, Palaiseau; Jean-Francois Petit, Paris; Edgar Lederer, Sceaux; Chantal, born Rousselot Damais, Le Vesinet; Louis Chedid, and Constantin Bona, both of Paris, all of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

Filed Apr. 24, 1975, Ser. No. 571,384
Claims priority, application France, Apr. 25, 1974, 74.14500
Int. Cl.[2] A61K *39/02*
U.S. Cl. 424—12 **22 Claims**

1. In the process for preparing a water-soluble agent which comprises treating an aqueous suspension of delipidated Nocardia cells with a muramidase to free the mitogenic agent and immunological non-specific adjuvant peptidoglycane and other adjuvant fragments that were contained therein, separating the solid fraction from the mixture, recovering the aqueous mixture containing the mitogenic agent and immunological non-specific adjuvant peptidoglycane fragments, the improvement comprising:

separating from the aqueous mixture the portion containing the adjuvant peptidoglycane fragments, which adjuvant is soluble in concentrated acetic acid, and recovering the remaining fraction which contains the mitogenic agent, said agent being insoluble in concentrated acetic acid.

10. A mitogenic agent from delipidated Nocardia cells which is free of peptidoglycane fragments which have adjuvant activity, are soluble in concentrated acetic acid and which agent is active in vivo, water-soluble concentrated acetic acid-insoluble and which is capable of stimulating B-lymphocytes and the proliferation of stem cells.

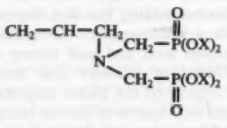
4,042,679

ANTIBACTERIAL ORAL COMPOSITION

Abdul Gaffar, Somerset, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Nov. 7, 1975, Ser. No. 629,749
Int. Cl.[2] A61K *7/22*
U.S. Cl. 424—54 **10 Claims**

1. An oral composition comprising an oral vehicle, a quaternary ammonium antibacterial antiplaque agent and a water soluble polymeric polyphosphonic compound having the recurring group:



wherein X is selected from the group consisting of hydrogen and an orally acceptable cation and said compound has a molecular weight of at least about 2,000.

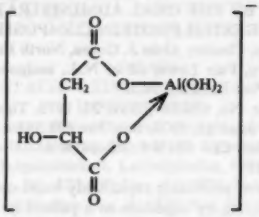
4,042,680

ANTICARIOGENIC MALOALUMINATE COMPLEXES

Joseph C. Muhler, Howe; Mark S. Putt; Carl J. Kleber, both of Forth Wayne, Ind., and Clayton W. Yoho, Racine, Wis., assignors to Indiana University Foundation, Bloomington, Ind.

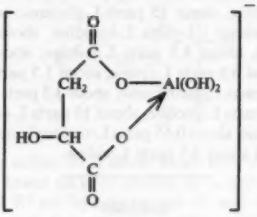
Filed Aug. 2, 1975, Ser. No. 710,443
Int. Cl.[2] A61K *7/24*
U.S. Cl. 424—55 **8 Claims**

1. Aqueous anionic maloaluminate complexes of the structure:



2. Oral compositions for dental caries prophylaxis comprising:

an anticariogenically effective and non-toxic amount of an aqueous anionic maloaluminate complex of the structure:



and

a carrier suitable for use in the oral cavity,

the pH of such composition lying in the range of about 7.0 – 9.0.

4,042,681
COMPOSITE ATTRACTANT FOR BERTHA ARMYWORM MOTH

Edward W. Underhill; Melvin D. Chisholm; Warren F. Steck; Berton K. Bailey; Peter M. Lamb, all of Saskatoon; Dean L. Struble, and G. Edward Swailes, both of Lethbridge, all of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Dec. 22, 1975, Ser. No. 643,597
Int. Cl.[2] A01N *17/14*
U.S. Cl. 424—84 **8 Claims**

1. A composite insect attractant for male Bertha Armyworm moths (*Mamestra configurata*) comprising:

A. Z-11-hexadecen-1ol acetate, and

B. Z-9-tetradecen-1-ol acetate wherein the proportions of A and B are within about 90–99% of A and about 10-1% of B.

4,042,682
ENDOGENOUS MORPHINE-LIKE COMPOUND

Sidney Spector, Livingston, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Apr. 7, 1976, Ser. No. 674,467
Int. Cl.[2] A61K *35/30, 31/485;* **C07D** *489/00*
U.S. Cl. 424—95 **2 Claims**

1. A morphine-like compound endogenous in mammalian brain tissue having the following physical, chemical and biological properties:

a. effectively binds to morphine specific antibodies;

b. non-peptidic as indicated by resistance to peptidases, acid hydroylysis and heat;

c. has the same R_f as morphine by thin layer chromatography;

d. exhibits opiate agonist activity as indicated by the guinea pig ileum and mouse vas deferens assays, which activity is not blocked by pretreatment with naloxone or naltrexone;

e. produces a blue color when treated with a ferric chloride-ferricyanide mixture indicating the presence of a phenolic moiety;

f. is filterable through a filter having a one thousand molecular weight cutoff, said morphine-like compound being essentially free of other substances normally present in mammalian brain tissue.

2. A morphine-like compound endogenous in mammalian brian tissue prepared by the following process:

a. treating a methanol extract of mammalian brain tissue with morphine specific antibody so as to form a conjugate between said morphine-like compound and said antibody;

b. separating said conjugate from said extract by precipitating said conjugate by addition of ammonium sulphate;

c. separating said morphine-like compound from said antibody by heat denaturization followed by ultrafiltration through a filter having a cutoff of molecular weight one thousand; and

d. recovering said morphine-like compound from the ultrafiltration filtrate.

4,042,683
RIFAMYCINS P, Q AND U

Richard J. White, High Wycombe, England; Giancarlo Lancini, Pavia, and Piero Antonini, Arluno, both of Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy

Filed Aug. 4, 1975, Ser. No. 601,559
Claims priority, application United Kingdom, Aug. 30, 1974, 37913/74
Int. Cl.[2] A61K *35/00*
U.S. Cl. 424—117 **3 Claims**

1. A rifamycin compound defined as rifamycin P having the following characteristics:

1. Elemental analysis (%): C=60.6; H=6.2; N=3.8; O=25.2; S=4.1

2. U.V. and visible absorption bands (FIG. 1):

methanol		0.1 N HCl	
λ_{max}(mμ)	$E^{1\%}_{1cm}$	λ_{max}(mμ)	$E^{1\%}_{1cm}$
406	197	416	183
350	(shoulder)	300	319
297	344	225	521
257	423		
224	550		

3. The most significant infrared absorptiion peaks in Nujol at the following frequencies ($cm.^{-1}$) (FIG. 2): 3700–3150 (m, br); 3100 (w); 3060–2800 (vs); 1465 (s); 1380 (b): Nujol; 1722 (m); 1645 (m, br); 1580 (m); 1510 (m); 1325 (m); 1250 (s br); 1160 (m); 1130 (w); 1070 (m, br) 1030 (w); 982 (m); 960 (m); 925 (w); 890 (m); 818 (w); 770 (w); 735 (w),

4. A mass spectrum at 70 ev showing the molecular ion peak M^+ at the following m/e value: 738,

5. A complete figure of N.M.R. spectrum at 100 MH_z in $CDCl_3$ as in FIG. 3,

6. Rf value of 0.57 on silicagel plate using chloroform:methanol (95:5) as a solvent system.

4,042,684
DIETETIC BEVERAGE

Annika Britt Kahm, 930 Fifth Ave No. 4F, New York, N.Y. 10021

Filed Mar. 23, 1976, Ser. No. 669,564
Int. Cl.[2] A23L *2/00;* **A61K** *27/00*
U.S. Cl. 424—153 **3 Claims**

1. Beverage for supplementing the dietetic requirements of sugars and essential salts in a mammalian body depletable through vigorous physical activity, thereby enhancing the

level of available, utilizable energy stores within the body, comprising the composition by weight:

Fructose	0.4–0.7%
Glucose	1.6–2.8%
Sodium Chloride	0.16–0.33%
Potassium Chloride	0.03–0.13%
Free Citric Acid	0.026–0.26%
Water	balance.

4,042,685

MILK OF MAGNESIA

Walton John Smith, P.O. Box 461, Wilton, Conn. 06897

Continuation of Ser. No. 470,026, May 15, 1974, abandoned, which is a continuation-in-part of Ser. No. 301,596, Oct. 27, 1972, abandoned, and Ser. No. 131,559, April 5, 1971, abandoned. This application Sept. 22, 1975, Ser. No. 615,507

Int. Cl.[2] A61K *33/08*

U.S. Cl. 424—158 **4 Claims**

1. An article of manufacture comprising a desiccated mixture of magnesium hydroxide magma and dextrin in an amount of from 1 to 3 parts by weight per part of magnesium hydroxide in said magma, said desiccated mixture being produced by spray or freeze drying.

4,042,686

FUNGICIDAL COMPOSITIONS

Ernst-Heinrich Pommer, Limburgerhof; Rudolf Polster, Frankenthal, and Friedrich Loecher, Limburgerhof, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Apr. 13, 1976, Ser. No. 676,571

Claims priority, application Germany, May 14, 1975, 2521405

Int. Cl.[2] A01N *13/00, 9/20, 9/24*

U.S. Cl. 424—164 **4 Claims**

1. A synergistic fungicidal composition consisting essentially of

a. wettable sulfur and

b. diisopropyl 3-nitroisophthalate, the weight ratio of *a:b* being from 2:1 to 5:1.

4,042,687

METHOD OF TREATING OBESITY BY THE ORAL ADMINISTRATION OF A PREDIGESTED PROTEIN COMPOSITION

Arnold M. Gans, Closter; Alvin J. Goren, North Bergen, and Eli M. Gorenberg, Fair Lawn, all of N.J., assignors to Control Drug, Inc., Port Reading, N.J.

Division of Ser. No. 634,857, Nov. 24, 1975, abandoned. This application June 22, 1976, Ser. No. 698,354

Int. Cl.[2] A01N *9/20;* **A61K** *37/00*

U.S. Cl. 424—177 **4 Claims**

1. A method of treating obesity which comprises administering by ingestion to a patient in need of said treatment a nutritionally effective amount, in lieu of other foods, of a composition comprising about 5 to about 75 parts by weight of hydrolyzed gelatin, about 0.02 to about 0.75 parts by weight of tryptophane, about 0.1 to about 2 parts by weight of a sweetener, and about 5 to about 100 parts by weight of an ingestible carrier, said nutritional composition containing essentially the following amino acids in parts by weight: about 13 parts L-alanine, about 12 parts L-arginine, about 9 parts L-aspartic acid, about 0.1 parts L-cystine, about 15 parts L-glutamic acid, about 35 parts glycine, about 1.1 parts L-histidine, about 10 parts L-hydroxyproline, about 4.5 parts L-leucine, about 2 parts L-isoleucine, about 6.5 parts L-lysine, about 1.5 parts hydroxylysine, about 1.1 parts L-methionine, about 3.5 parts L-phenylalanine, about 23 parts L-proline, about 10 parts L-serine, about 3 parts L-threonine, about 0.65 parts L-tryptophane, about 1 part L-tyrosine, and about 3.5 parts L-valine.

4,042,688

METHOD OF PROVIDING HIGH-PROTEIN NUTRITION BY THE ORAL ADMINISTRATION OF A PREDIGESTED PROTEIN COMPOSITION

Arnold M. Gans, Closter; Alvin J. Goren, North Bergen, and Eli M. Gorenberg, Fair Lawn, all of N.J., assignors to Control Drug, Inc., Port Reading, N.J.

Division of Ser. No. 634,857, Nov. 24, 1975. This application June 22, 1976, Ser. No. 698,352

Int. Cl.[2] A01N *9/20;* **A61K** *37/00*

U.S. Cl. 424—177 **7 Claims**

1. A method of providing rapid body build-up which comprises administering by ingestion to a patient in need of such body buildup a nutritionally effective amount of a composition comprising about 5 to about 75 parts by weight of hydrolyzed gelatin, about 0.02 to about 0.75 parts by weight of tryptophane, about 0.1 to about 2 parts by weight of a sweetener, and about 5 to about 100 parts by weight of an ingestible carrier, said nutritional composition containing essentially the following amino acids in parts by weight: about 13 parts L-alanine, about 12 parts L-arginine, about 9 parts L-aspartic acid, about 0.1 parts L-cystine, about 15 parts L-glutamic acid, about 35 parts glycine, about 1.1 parts L-histidine, about 10 parts L-hydroxyproline, about 4.5 parts L-leucine, about 2 parts L-isoleucine, about 6.5 parts L-lysine, about 1.5 parts hydroxylysine, about 1.1 parts L-methionine, about 3.5 parts L-phenylalanine, about 23 parts L-proline, about 10 parts L-serine, about 3 parts L-threonine, about 0.65 parts L-tryptophane, about 1 part L-tyrosine, and about 3.5 parts L-valine.

4,042,689

ALKYLATED ORGOTEIN

Wolfgang Huber, Atherton; Mark G. Saifer, Berkeley, and Lewis D. Williams, Menlo Park, all of Calif., assignors to Diagnostic Data, Inc., Mountain View, Calif.

Filed Sept. 9, 1975, Ser. No. 611,657

Int. Cl.[2] A61K *37/02, 37/14;* **C07G** *7/04*

U.S. Cl. 424—177 **15 Claims**

1. Alkylated orgotein wherein an alkyl group of up to 8 carbon atoms is present on at least one lysine ε-amino group thereof.

14. A pharmaceutical composition having antiinflammatory activity comprising, in admixture with a pharmaceutically acceptable carrier, an antiinflammatorily effective unit dosage amount of an alkylated orgotein of claim **1.**

4,042,690

METHOD OF COMBATTING BLOWFLY LARVAE

Wolfgang Hofer; Fritz Maurer; Hans-Jochem Riebel, and Wilhelm Stendel, all of Wuppertal-Elberfeld, Germany, assignors to Bayer Aktiengesellschaft, Germany

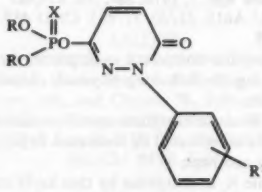
Filed Aug. 2, 1976, Ser. No. 710,680

Claims priority, application Germany, Aug. 22, 1975, 2537486

Int. Cl.[2] A61K *31/675*

U.S. Cl. 424—200 **5 Claims**

1. The method of combatting infestation of animals by blowfly larvae which comprises applying to the infested animal a blowfly larvae biocidal amount of a compound of the formula:



wherein

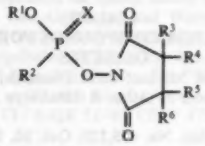
R is alkyl of 1 to 4 carbon atoms;
R^1 is hydrogen or nitro; and
X is oxygen or sulfur.

4,042,691
SUCCINIC ACID OXIMIDOPHOSPHORIC ESTER INSECTICIDES

Karl Kiehs, Lampertheim; Heinrich Adolphi, Limburgerhof, and Rolf Huber, Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Division of Ser. No. 523,665, Nov. 14, 1974, Pat. No. 3,960,885. This application Jan. 2, 1976, Ser. No. 646,180
Claims priority, application Germany, Dec. 5, 1973, 2360493
Int. Cl.[2] A01N *9/36*
U.S. Cl. 424—200 9 Claims

1. A process for combatting insects which comprises treating the insects with an insecticidally effective amount of a succinic acid oximidophosphoric ester of the formula



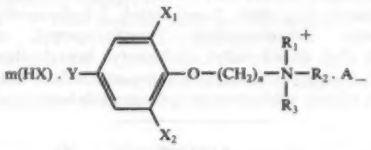
wherein: X is sulfur; R^1 is lower alkyl; R^2 is lower alkoxy or phenyl; R^3 is lower alkyl or phenyl; R^4 is hydrogen or lower alkyl; R^5 and R^6 are hydrogen; and R^3 and R^4 when taken together form a hydrocarbon ring of five to six members.

4,042,692
SUBSTITUTED PHENOXYALKYL QUATERNARY AMMONIUM COMPOUNDS AS ANTIARRHYTHEMIC AGENTS

Stanley J. Strycker, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 484,525, July 1, 1974, Pat. No. 3,932,664, which is a division of Ser. No. 164,086, July 19, 1971, Pat. No. 3,875,215. This application Jan. 12, 1976, Ser. No. 648,546
Int. Cl.[2] A61K *31/33*
U.S. Cl. 424—244 8 Claims

5. A method for combatting cardiac arrhythmias which comprises administering to an animal a cardiac antiarrhythmic amount of a quaternary ammonium compound corresponding to the formula



wherein Y represents amino, loweralkylamino or dialoweralkylamino; R_1 and R_2 taken together represent an aliphatic hydrocarbon moiety of 6 carbon atoms substituted with zero, one or two lower alkyl substitutents; R_3 independently is selected from the group consisting of lower alkenyl, phenacyl, mono-, di-, or trihalophenacyl, lower alkynyl, substituted lower alkyl, substituted lower alkenyl and substituted lower alkynyl substituted with a substituent selected from the group consisting of halogen, phenyl, halophenyl, dihalophenyl, trihalophenyl, nitrilo and hydroxy; X_1 and X_2 both represent halogen; A^- represents a stoichiometric equivalent quantity of a pharmaceutically-acceptable anion; *n* represents one of the integers 2, 3 or 4; HX represents a stoichiometric equivalent quantity of a pharmaceutically-acceptable acid; and *m* represents one of the integers zero and one.

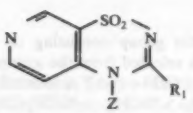
4,042,693
DERIVATIVES OF 1,2,4-THIADIAZINE

Jacques E. Delarge, Dolembreux; Charles L. Lapiere, Tongeren, and André H. Georges, Ottignies, all of Belgium, assignors to A. Christiaens Societe Anonyme, Brussels, Belgium

Continuation-in-part of Ser. No. 568,759, April 16, 1975. This application June 9, 1976, Ser. No. 694,422
Claims priority, application United Kingdom, Apr. 14, 1975, 16836/75
Int. Cl.[2] C07D *285/24;* A61K *31/54*
U.S. Cl. 424—246 6 Claims

1. A compound of the formula:

(I)



in which R_1 represents an unsubstituted phenyl group or a phenyl group substituted by a halogen atom, and Z represents an unsubstituted phenyl group or a phenyl group substituted by one or two halogen atoms or by a C_1–C_4 alkyl or alkoxy group or by the trifluoromethyl group, and the pharmaceutically acceptable base and acid addition salts of said compounds.

6. Pharmaceutical compositions containing at least one compound according to claim 1 as active ingredient in an anti-inflammatory effective amount, together with a pharmaceutical carrier or vehicle.

4,042,694
NOVEL HETEROCYCLIC ESTERS OF BENZOPYRANOPYRIDINES

Louis Selig Harris, Richmond, Va.; Harry George Pars; John Clark Sheehan, both of Lexington, Mass., and Raj Kumar Razdan, Belmont, Mass., assignors to Sharps Associates, Cambridge, Mass.

Continuation-in-part of Ser. No. 311,953, Dec. 4, 1972, Pat. No. 3,991,194, which is a continuation-in-part of Ser. No. 212,819, Dec. 27, 1971, abandoned. This application Mar. 8, 1976, Ser. No. 664,907
The portion of the term of this patent subsequent to Nov. 9, 1993, has been disclaimed.
Int. Cl.[2] C07D *491/04*
U.S. Cl. 424—248.55 13 Claims

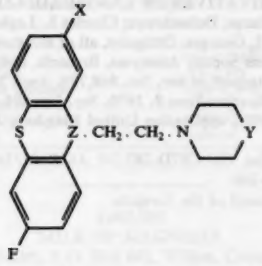
1. A compound named 5,5-dimethyl-10-[2-methyl-4-(2-methylpiperidino) butyryloxy]-8-(3-methyl-2-octyl)-2-(2-propynyl)-1,2,3,4-tetrahydro-5H-[1]benzopyrano[3,4-d]pyridine or a pharmaceutically acceptable acid addition salt thereof.

4,042,695
THIAXANTHENE DERIVATIVES, COMPOSITIONS THEREOF AND METHODS OF TREATING THEREWITH

Jorn Lasse Martin Buus, Bjaeverskov; Niels Lassen, Gentofte, and Allan Johan Bigler, Copenhagen, all of Denmark, assignors to Kefalas A/S, Copenhagen-Valby, Denmark

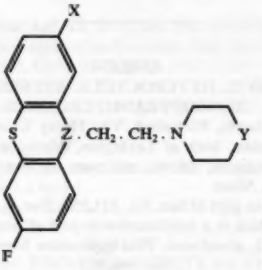
Continuation-in-part of Ser. No. 593,559, July 7, 1975, which is a continuation-in-part of Ser. No. 421,279, Dec. 3, 1973, abandoned. This application Aug. 13, 1975, Ser. No. 604,462
Claims priority, application United Kingdom, Dec. 8, 1972, 56910/72
Int. Cl.[2] A61K *31/445, 31/495;* C07D *409/06*
U.S. Cl. 424—250 31 Claims

1. A compound selected from the group consisting of (1) a fluoro-substituted thiaxanthene of the formula



wherein X is selected from the group consisting of —Cl, $—CF_3$ and $—SO_2N(CH_3)_2$, Z is selected from the group consisting of >CH·CH$_2$—and >C=CH—, and Y is selected from the group consisting of >NH, >N·CH$_3$, >N·CH$_2$·CH$_2$OH, >N·CH$_2$·CH$_2$OAc, >CH·CH$_3$, >CH·CH$_2$·CH$_2$OH and >CH·CH$_2$·CH$_2$OAc, wherein —Ac is an acyl radical of an aliphatic carboxylic acid having from one to 30 carbon atoms inclusive, and (2) and acid addition salt thereof with a pharmaceutically acceptable acid.

17. A pharmaceutical composition useful as a neuroleptic and anti-psychotic in unit dosage form consisting essentially of a major quantity of a pharmaceutical carrier and as an active ingredient a pharmaceutically effective dose of a compound selected from the group consisting of (1) a fluoro-substituted thiaxanthene of the formula:



wherein X is selected from the group consisting of —Cl, $—CF_3$ and $SO_2N(CH_3)_2$, Z is selected from the group consisting of > CH·CH$_2$— and > C=CH—, and Y is selected from the group consisting of > NH, > N·CH$_3$, > N·CH$_2$·CH$_2$OH, > N·CH$_2$·CH$_2$·OAc, > CH·CH$_2$·CH$_2$OH and > CH·CH$_2$·CH$_2$OAc, wherein —Ac is an acyl radical of an aliphatic carboxylic acid having from one to thirty carbon atoms inclusive, and (2) an acid addition salt thereof with a pharmaceutically acceptable acid.

4,042,696

INSECTICIDAL SULFONIUM SALTS

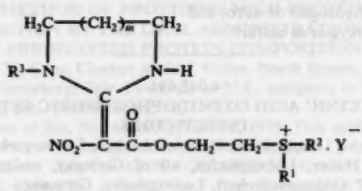
Alvin Clifford Boyer, Modesto, Calif., assignor to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 582,577, June 2, 1975, abandoned. This application Feb. 20, 1976, Ser. No. 659,886

Int. Cl.^{2} A01N *9/22*; C07D *239/02*

U.S. Cl. 424—251 **5 Claims**

1. A sulfonium salt of the formula:



wherein *m* is 0 or 1, R^1 is alkyl of from 1 to 3 carbon atoms, R^2 is alkyl of from 1 to 10 carbon atoms, R^3 is alkyl or cyanoalkyl of from 1 to 3 carbon atoms, or is allyl, 3-chloroallyl or 2-propynyl and Y is chloride, bromide or iodide.

4. An insecticidal composition adapted to controlling insects of the genus Heliothis comprising an insecticidal amount of a salt of claim **1** together with an insecticidal adjuvant therefor.

4,042,697

ISOQUINOLIUM COMPOUNDS FOR TREATING DIABETES

Peter Garside, and Michael John Dimsdale, both of London, England, assignors to Allen & Hanburys Limited, London, England

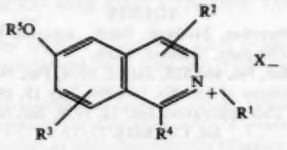
Continuation of Ser. No. 405,120, Oct. 10, 1973, abandoned. This application Nov. 17, 1975, Ser. No. 632,577

Claims priority, application United Kingdom, Oct. 19, 1972, 48211/72

Int. Cl.^{2} A61K *31/47*

U.S. Cl. 424—258 **13 Claims**

1. A method of treatment of diabetes which comprises administering to a patient an effective amount of a compound of the formula:



in which R^1 represents C_{1-4} alkyl; aminoethyl; dimethylaminoethyl; 2-ethoxyethyl; allyl; propynyl; benzyl, p-methoxybenzyl; phenoxyethyl; phenacyl or 4-methoxyphenacyl; R^2 represents hydrogen or C_{1-4} alkyl; R^3 represents hydrogen; R^4 represents hydrogen; methyl, ethyl; benzyl; or p-methoxyphenyl; R^5 represents C_{1-5} alkyl; 2-aminoethyl; 2-hydroxyethyl; 2-ethoxyethyl, 2-methoxyethyl, 3-methoxypropyl, ethoxymethyl; allyl, dimethylallyl; cyclopentyl; benzyl; phenoxyethyl or 3-tetrahydrofuranyl; X represents iodide, bromide, chloride, toluene sulphonate or hydrogen sulphate.

4,042,698

TREATMENT OF MYASTHENIA GRAVIS AND ORAL MEDICATION THEREFOR

Joseph Francis Zappia, 118 N. Gibson St., Indianapolis, Ind. 46219

Continuation of Ser. No. 357,657, May 7, 1973, abandoned, which is a continuation of Ser. No. 75,277, Sept. 24, 1970, abandoned. This application July 18, 1975, Ser. No. 597,302

Int. Cl.^{2} A61K *31/475*

U.S. Cl. 424—262 **8 Claims**

1. The method of treating a human being having the condition known as myasthenia gravis which comprises: administering strychnine to the said human being in at least an effective amount to ameliorate the symptoms of the condition but less than the amount which will cause persistent fasciculation of facial muscles of said human being.

4,042,699

METHOD FOR REDUCING SERUM GLUCOSE LEVELS

Shreekrishna M. Gadekar, Trenton, N.J., assignor to Affiliated Medical Research, Inc., Princeton, N.J.

Division of Ser. No. 530,684, Dec. 9, 1974, Pat. No. 3,976,281, which is a continuation-in-part of Ser. No. 380,655, July 19, 1973, abandoned, which is a continuation-in-part of Ser. No. 315,836, Dec., 1872, Pat. No. 3,839,376. This application May 14, 1976, Ser. No. 686,648

Int. Cl.[2] A61K *31/44*

U.S. Cl. 424—263 6 Claims

1. A method for reducing the glucose level in the serum of a mammal which comprises administering to said mammal a therapeutically effective amount of 5-methyl-1-phenyl-2-(1H)-pyridone.

4,042,700

QUATERNARY N-β-SUBSTITUTED N-ALKYL-NORTROPINE BENZILATES

Rolf Banholzer, Ingelheim am Rhein; Rudolf Bauer, Wiesbaden; Alex Heusner, Gau-Algesheim, and Werner Schulz, Ingelheim, Rhein, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

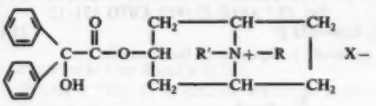
Filed Sept. 3, 1976, Ser. No. 720,245

Claims priority, application Germany, Sept. 12, 1975, 2540633

Int. Cl.[2] A61K *31/46;* C07D *471/08*

U.S. Cl. 424—265 11 Claims

1. A compound of the formula



wherein

one of R and R′ is alkyl of 1 to 4 carbon atoms,

the other of R and R′ is β-haloethyl or β-hydroxyethyl, and

X is a pharmacologically acceptable anion.

8. A spasmolytic or bronchospasmolytic pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective spasmolytic or bronchospasmolytic amount of a compound of claim 1.

4,042,701

7,7-DIPHENYL-1,4-OXAZEPINOALKYL-DICARBOXIMIDES

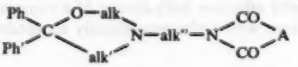
Robert Mathews Bowman, Summit, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Sept. 22, 1975, Ser. No. 615,259

Int. Cl.[2] C07D *413/6*

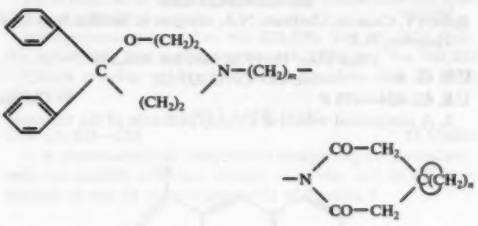
U.S. Cl. 424—267 8 Claims

1. An N-(7,7-diphenyl-hexahydro-1,4-oxazepin-4-yl-alkyl)-dicarboximide corresponding to the formula



wherein each of alk and alk′ is lower alkylene separating the adjacent atoms by 2 carbon atoms, alk″ is lower alkylene separating the adjacent atoms by at least 2 carbon atoms, each of Ph and Ph′ is phenyl, unsubstituted or substituted by up to three members of lower alkyl, lower alkoxy, lower alkylmercapto, hydroxy, halogeno or trifluoromethyl, and A is lower alkylene, lower alkenylene, 5 to 7 ring-membered mono- or bicyclic 1,2- or 1,3-(cycloalkylene or cycloalkenylene), 5 to 7 ring-membered spirocycloalkane-lower alkylene or 1,2-phenylene, said mono- or bicyclic 1, 2- or 1,3-(cycloalkylene or cycloalkenylene) are unsubstituted or substituted by up to three lower alkyls, and said 1,2-phenylene radical is substituted in the same manner as Ph, or a therapeutically acceptable acid addition salt thereof.

4. A compound as claimed in claim 1 and corresponding to the formula



wherein *m* is an integer from 2 to 4 and n such from 4 to 5, or a therapeutically acceptable acid addition salt thereof.

7. A pharamaceutical composition for treating asthmatic, allergic and inflammatory conditions in mammals comprising a pharmacologically effective amount of a compound as claimed in claim 1, together with a pharmaceutical excipient.

4,042,702

HALOGEN PYRAZOLE DERIVATIVES, A METHOD FOR PRODUCING THESE HALOGEN PYRAZOLE DERIVATIVES, MEDICAMENTS CONTAINING AND METHODS OF USING THEM

Georg Rainer, Constance, Germany, assignor to Byk Gulden Lomberg Chemische Fabrik GmbH, Germany

Continuation of Ser. No. 497,380, Aug. 14, 1974, abandoned. This application Oct. 31, 1975, Ser. No. 627,707

Claims priority, application Luxembourg, Aug. 16, 1973, 68238

Int. Cl.[2] A61K *31/415, 31/535;* C07D *231/10*

U.S. Cl. 424—273 P 18 Claims

1. A pharmaceutically-acceptable member selected from the group consisting of a 1,3-diaryl-5-halopyrazole-4-acetic acid and a salt thereof; the 5-halo being 5-fluoro, 5-chloro or 5-bromo, and each aryl being, independently, a) phenyl or b) phenyl substituted by a substituent selected from the group consisting of halo, p-(lower)alkoxy and p-(lower)alkyl.

18. A therapeutic method for treating a mammal suffering fron one or more systems of inflammation, pain or fever which comprises administering to the mammal a sympton-reducing-effective, pharmacologically-compatible dose of composition according to claim 11.

4,042,703

METHOD OF TREATING AND PREVENTING COCCIDIOSIS

Urs Burckhardt, and Alfred Meyer, both of Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

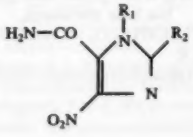
Filed Jan. 2, 1976, Ser. No. 646,315

Claims priority, application Switzerland, Jan. 8, 1975, 167/75; Nov. 27, 1975, 15389/75

Int. Cl.[2] A61K *31/415*

U.S. Cl. 424—273 R 2 Claims

1. A method for the treatment and prevention of coccidiosis in poultry, which comprises feeding the poultry an effective amount of a compound of the formula



wherein each of R_1 and R_2 represents hydrogen or alkyl of from 1 to 4 carbon atoms.

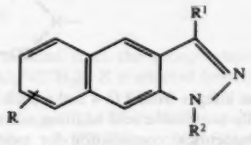
4,042,704

BENZINDAZOLES

Robert V. Coombs, Chatham, N.J., assignor to Sandoz, Inc., East Hanover, N.J.

Filed Mar. 18, 1976, Ser. No. 668,266
Int. Cl.[2] C07D *231/56*
U.S. Cl. 424—273 P **41 Claims**

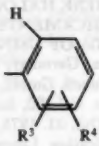
1. A compound which is a benz[f]indazole of the formula:



wherein

R is a hydrogen atom, fluoro, chloro, bromo, alkyl having from 1 to 4 carbon atoms or alkoxy having from 1 to 4 carbon atoms;

R^1 is substituted or unsubstituted phenyl of the structure:



in which R_3 and R_4 are selected independently from the group consisting of a hydrogen atom, alkyl having from 1 to 4 carbon atoms, alkoxy having from 1 to 4 carbon atoms, fluoro, chloro or bromo; and

R^2 is a hydrogen atom, alkyl having from 1 to 4 carbon atoms, alkenyl having from 2 to 4 carbon atoms, or alkynyl having from 2 to 4 carbon atoms, provided that:

1. when R^3 and R^4 are on adjacent carbons, they are not both branched alkyl or alkoxy; and
2. when R is bromo and when R^3 is chloro or bromo, then R^4 is not chloro or bromo; or a pharmaceutically acceptable acid addition salt thereof.

38. A pharmaceutical composition suitable for parenteral administration to terminate pregnancy comprising as the active ingredient an effective amount of the compound of claim **1** and a pharmaceutically accceptable liquid carrier therefor.

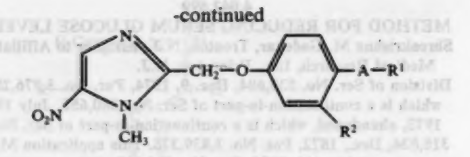
4,042,705

1-METHYL-2-(PHENYL-OXYMETHYL)-5-NITRO-IMIDAZOLES AND PROCESS FOR THEIR MANUFACTURE

Erhardt Winkelmann, Kelkheim, Taunus, and Wolfgang Raether, Dreieichenhain, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed July 9, 1976, Ser. No. 704,100
Claims priority, application Germany, July 12, 1975, 2531303; Feb. 11, 1976, 2605222
The portion of the term of this patent subsequent to June 2, 1994, has been disclaimed.
Int. Cl.[2] C07D *233/94*; A61K *31/415*
U.S. Cl. 424—273 R **3 Claims**

1. A 1-methyl-2-(phenyl-oxymethyl)-5-nitro-imidazole of the formula I



(I)

in which A stands for a sulfur atom or a sulfoxide (—SO—) group, R^1 stands for methyl or ethyl, and R^2 for hydrogen methyl or halogen.

3. A method of treating protozoal diseases as well as diseases caused by bacteria and fungi, by administering to the infected organism and effective amount of a compound as claimed in claim **1**.

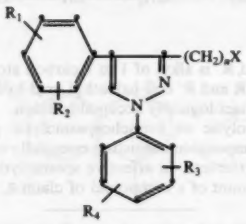
4,042,706

NOVEL ANTI-INFLAMMATORY PYRAZOLE DERIVATIVES AND PREPARATION THEREOF

Hanns Ahrens; Henning Koch; Eberhard Schröder; Helmut Biere, and Joachim-Friedrich Kapp, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin & Bergkamen, Germany

Filed Aug. 9, 1976, Ser. No. 712,659
Claims priority, application Germany, Aug. 8, 1975, 2536003
Int. Cl.[2] A61K *31/415*; C07D 231/12
U.S. Cl. 424—273 P **22 Claims**

1. A pyrazole compound of the formula



wherein

n is 1, 2, 3, or 4;

R_1, R_2, R_3, and R_4 each are hydrogen, halogen, alkyl of up to 6 carbon atoms, alkoxy of up to 6 carbon atoms, trifluoromethyl, nitro or amino; and

X is cyano, carbamoyl, carbalkoxy of up to 6 carbon atoms in the alkoxy or carboxy and, when X is carboxy, physiologically acceptable salts thereof.

22. A method of treating an inflammatory condition, comprising administering to a patient afflicted therewith an anti-inflammatorily effective daily dosage of a compound of claim **1**, in admixture with a pharmaceutically acceptable carrier.

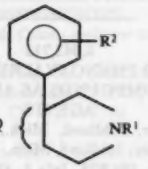
4,042,707

3α-ARYLHYDROISOINDOLES

William Charles Ripka, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 19, 1976, Ser. No. 659,510
Int. Cl.[2] A61K *31/40*; C07D *209/44*
U.S. Cl. 424—274 **63 Claims**

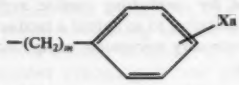
1. A compound of the group (A) having the general formula



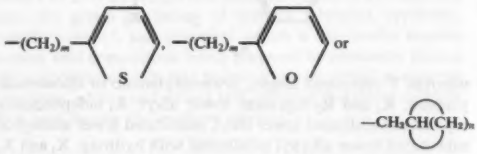
wherein

R^1 is H, alkyl of 1–8 carbons,

$-CH_2Y$ where Y is alkenyl or alkynyl of 2–6 carbons,



where *m* is 1 or 2, *a* is 0 or 1 and X is F, Cl, Br, CF_3, OCH_3, CH_3, C_2H_5, C_3H_7, C_4H_9 $-NH_2$ or $N(CH_3)_2$,

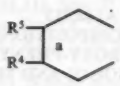


where *m* is 1 or 2 and *n* is 2–5.

R^2 is H, OH, OCH_3, F, or $OCOR^3$ where R^3 is alkyl or 1–3 carbons; and

Q is:

(1)



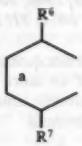
in which

R^4 and R^5 are each H or CH_3, or

R^4 and R^5 are H, CH_3, C_2H_5, *i*—C_3H_7, Cl, or OCH_3 with the proviso that one only of R^4 or R^5 is hydrogen;

a is a single or double bond; with the proviso that when R^4 or R^5 is Cl or OCH_3, *a* is a double bond; or

(2)



in which

R^6 and R^7 are each OH or $OCOCH_3$; or

R^6 and R^7 are H, OH, $OCOCH_3$, OCH_3 or CH_3 with the proviso that one only of R^6 or R^7 is H;

a is a single or double bond; and

(B) a pharmaceutically acceptable acid addition salt of (A).

21. A pharmaceutical composition comprising a suitable pharmaceutical carrier and an effective analgesic amount of a compound of claim **1.**

41. A method of producing analgesia in a mammal which comprises administering to the mammal an effective analgesic amount of a compound of claim **1.**

4,042,708

PHARMACEUTICAL COMPOSITIONS CONTAINING 4-CARBOXY-FLAVONES

Thomas Brian Lee, Loughborough; David Norman Hardern, Sutton Bonington, and John Raymond Bantick, Burton-on-the-Wolds, all of England, assignors to Fisons Limited, London, England

Continuation-in-part of Ser. No. 522,590, Nov. 11, 1974, Pat. No. 3,948,955. This application Jan. 14, 1976, Ser. No. 648,887

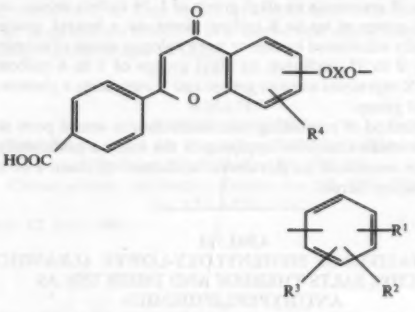
Claims priority, application United Kingdom, Dec. 2, 1975, 49547/75

Int. Cl.[2] **A61K** *31/35*

U.S. Cl. 424—283 **15 Claims**

1. A pharmaceutical composition comprising a pharmaceutically acceptable adjuvant, diluent or carrier and an effective amount of one or more compounds of formula I

(I)



wherein R^1, R^2, R^3 and R^4, which may be the same or different, each represent hydrogen, hydroxy, alkenyl, alkanoyl or alkyl, and

X represents a hydrocarbon chain containing from 2 to 10 carbon atoms, optionally substituted by a hydroxy group or pharmaceutically acceptable salts thereof.

4,042,709

SUBSTITUTED PHENOXYALKYL QUATERNARY AMMONIUM COMPOUNDS AS ANTIARRHYTHMIC AGENTS

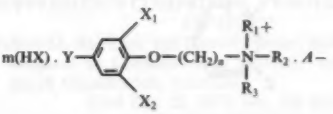
Stanley J. Strycker, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 484,525, July 1, 1974, Pat. No. 3,932,664, which is a division of Ser. No. 164,086, July 19, 1971, Pat. No. 3,875,215. This application Jan. 12, 1976, Ser. No. 648,550

Int. Cl.[2] **A61K** *31/275*

U.S. Cl. 424—304 **8 Claims**

5. A method for combatting cardiac arrhythmias which comprises administering to an animal a cardiac antiarrhythmic amount of a quaternary ammonium compound corresponding to the formula:



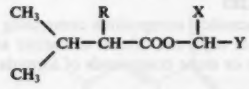
wherein Y represents amino, loweralkylamino or diloweralkylamino; R_1 and R_2 represent lower alkyl; R_3 independently represents substituted lower alkyl, substituted lower alkenyl or substituted lower alkynyl substituted with nitrilo X_1 and X_2 both represent halogen; A^- represents a stoichiometric equivalent quantity of a pharmaceutically-acceptable anion; *n* represents one of the integers 2, 3 or 4; HX represents a stoichiometric equivalent quantity of a pharmaceutically-acceptable acid; and *m* represents one of the integers 0 and 1.

4,042,710
ALPHA-CYANO-PHENOXYBENZYL-ISOVALERATES

Michael J. Bull, Lower Halstow, and Robert J. G. Searle, Sittingbourne, both of England, assignors to Shell Oil Company, Houston, Tex.

Filed May 18, 1976, Ser. No. 687,483
Claims priority, application United Kingdom, May 23, 1975, 22662/75; Dec. 22, 1975, 52342/75
Int. Cl.[2] A01N 9/20; C07C 121/66
U.S. Cl. 424—304 12 Claims

1. A 2-substituted isovalerate of the formula



wherein R represents an alkyl group of 1–16 carbon atoms, an alkenyl group of up to 6 carbon atoms, or a benzyl group optionally substituted by one or more halogen atoms of atomic number 9 to 35, inclusive, or alkyl groups of 1 to 6 carbon atoms; X represents a cyano group; and Y represents a phenoxyphenyl group.

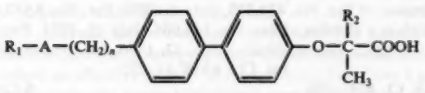
12. Method of combating tick, insect and/or acarid pests at a locus which comprises applying to the locus a pesticidally effective amount of an isovalerate as claimed in claim 1 or a composition thereof.

4,042,711
DERIVATIVES OF BIPHENYLOXY-LOWER ALKANOIC ACIDS, SALTS THEREOF AND THEIR USE AS ANTIHYPERLIPIDEMICS

Gerhart Griss, Biberach an der Riss; Wolfgang Grell, Biberach an der Riss; Rudolf Hurnaus, Biberach an der Riss; Robert Sauter, Laupheim; Bernhard Eisele, Biberach an der Riss; Nikolaus Kaubisch, Biberach an der Riss, and Matyas Leitold, Biberach an der Riss, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Continuation-in-part of Ser. No. 643,700, Dec. 23, 1975, Pat. No. 4,010,279. This application Nov. 11, 1976, Ser. No. 740,829
Claims priority, application Germany, Jan. 9, 1975, 2500692; Oct. 25, 1975, 2547872
Int. Cl.[2] C07C 103/46, 103/737, 103/84
U.S. Cl. 424—319 7 Claims

1. A compound of the formula



wherein R_1 is alkyl of 1 to 6 carbon atoms, cycloalkyl of 3 to 6 carbon atoms, phenylalkyl, phenylalkenyl or

where

X, Y and Z are each hydrogen, halogen, alkyl of 1 to 3 carbon atoms or alkoxy of 1 to 3 carbon atoms,

R_2 is hydrogen or alkyl of 1 to 4 carbon atoms,

A is —CO—NH— or —NH—CO—, and *n* is 1, 2 or 3,

or a non-toxic salt thereof formed with an inorganic or organic base.

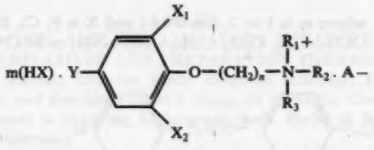
7. The method of lowering the level of lipids in the blood of a warm-blooded animal in need of such treatment, which comprises perorally, parenterally or rectally administering to said animal an effective antihyperlipidemic amount of a compound of claim 1.

4,042,712
SUBSTITUTED PHENOXYALKYL QUATERNARY AMMONIUM COMPOUNDS AS ANTIARRHYTHEMIC AGENTS

Stanley J. Strycker, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 484,525, July 1, 1974, Pat. No. 3,932,664. Which is a division of Ser. No. 164,086, July 19, 1971, Pat. No. 3,875,215
This application Jan. 12, 1976, Ser. No. 648,551
Int. Cl.[2] A61K 31/14
U.S. Cl. 424—329 8 Claims

5. A method for combatting cardiac arrhythmias which comprises administering to an animal a cardiac antiarrhythmic amount of a quaternary ammonium compound corresponding to the formula:



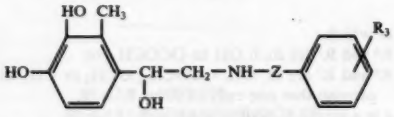
wherein Y represents amino, loweralkylamino or diloweralkylamino; R_1 and R_2 represent lower alkyl; R_3 independently represents substituted lower alkyl, substituted lower alkenyl or substituted lower alkynyl substituted with hydroxy. X_1 and X_2 both represent halogen; A⁻ represents a stoichiometric equivalent quantity of a pharmaceutically-acceptable anion; *n* represents one of the integers 2, 3 or 4; HX represents a stoichiometric equivalent quantity of a pharmaceutically-acceptable acid; and *m* represents one of the integers zero and one.

4,042,713
PHARMACEUTICAL COMPOSITIONS CONTAINING A 1-(2-ALKYL-3,4-DIHYDROXY-PHENYL)-2-(PHENYLALKYL-AMINO)-ALKANOL-(1) AND METHOD OF USE

Anton Mentrup; Kurt Schromm; Otto Thomä, and Karl Zeile, all of Ingelheim am Rhein, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Division of Ser. No. 485,348, July 3, 1974, Pat. No. 3,969,410, which is a continuation-in-part of Ser. No. 217,291, Jan. 12, 1972, abandoned, which is a continuation-in-part of Ser. No. 713,265, Oct. 16, 1967, Pat. No. 3,657,244. This application Apr. 20, 1976, Ser. No. 678,612
Claims priority, application Germany, Oct. 18, 1966, 89417; Oct. 20, 1966, 89476; Nov. 29, 1966, 90062
Int. Cl.[2] A61K 31/135
U.S. Cl. 424—330 14 Claims

1. A sympatomimetic pharmaceutical dosage unit composition consisting essentially of an inert pharmaceutical carrier and an effective sympathomimetic amount of a racemic mixture of a compound of the formula



wherein

R_3 is hydrogen or hydroxyl, and

Z is alkylene of 2 to 5 carbon atoms;

a pure stereoisomer thereof; a diastereoisomeric antipode pair thereof; or a non-toxic, pharmacologically acceptable acid addition salt of said racemic mixture, stereoisomer or diastereoisomeric antipode pair.

4,042,714

POLYDEXTROSE-BASED FARINACEOUS COMPOSITIONS

Anibal Torres, Waterford, Conn., assignor to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 624,026, Oct. 20, 1975, abandoned. This application July 23, 1976, Ser. No. 707,983
Int. Cl.[2] A21D *2/06*
U.S. Cl. 426—62 7 Claims

1. A low-calorie farinaceous composition comprising from about 20 to 75% by weight of modified polydextrose, from about 2 to 20% by weight of proteinaceous material selected from egg white, milk solids, sodium caseinate, calcium caseinate, soybean isolate, gluten and yeast, from about 10 to 40% by weight of cellulose derivative selected from alpha cellulose and micro-crystalline cellulose and from about 5 to 20% by weight of flour selected from wheat, corn, rice, rye and soya bean flour; said polydextrose being a water-soluble highly-branched polydextrose wherein the linkage of 1 → 6 predominates having a number average molecular weight between about 1,500 and 18,000 and containing (a) from about 0.5 to 5 mole percent of polycarboxylic acid ester group wherein the acid is selected from the group consisting of citric, fumaric, tartaric, succinic, adipic, itaconic and malic acids and (b) from about 5 to 20% by weight of a food-acceptable polyol selected from the group consisting of sorbitol, glycerol, erythritol, xylitol, mannitol, and galactitol which is chemically bonded thereto, said composition being prepared by intimately mixing said polydextrose with said proteinaceous material in aqueous dispersion, adding and mixing said cellulose derivative and said flour, and drying the resulting mixture.

4,042,715

DENSE, UNIFORMLY LAYERED VEGETABLE PROTEIN MEAT ANALOGUE

La Von G. Wenger, Sabetha; Elmer J. Osterhaus, Seneca, and Oak B. Smith, Shawnee Mission, all of Kans., assignors to Wenger Manufacturing, Sabetha, Kans.

Division of Ser. No. 581,111, May 27, 1975, Pat. No. 3,970,761. This application Dec. 19, 1975, Ser. No. 642,547
Int. Cl.[2] A23J *3/00;* A23L *1/20*
U.S. Cl. 426—104 11 Claims

1. A dense, extruded, layered meat analogue product comprising a plurality of juxtaposed, generally rectilinear, generally uniform layers which are substantially untwisted relative to each other, said layers being manually separable and are comprised of an admixture including a vegetable protein and moisture, said meat analogue product having a density prior to drying thereof of from about 20 to 40 lbs./cu.ft., and being prepared by a process which comprises the steps of:

heating and agitating an admixture comprising a vegetable protein and moisture to an extent sufficient to render the same hot, flowable and substantially unoriented;

moving said admixture under pressure through an elongated processing zone along a generally helical path of travel while simultaneously subjecting the admixture to displacement forces in an axial direction relative to the zone and also transversely of the longitudinal axis thereof, said displacement forces being of a magnitude to assure stretching and working of the protein for permitting subsequent orientation thereof in said product;

thereafter moving said admixture into an elongated processing area without substantially restricting the flow of admixture thereinto and subjecting the latter to displacement forces in said area which are primarily axial relative to the area;

causing the layering of said admixture by maintaining the axial movement thereof in said area while controlling the temperature and pressure therewithin at levels permitting said layering; and

extruding said admixture from said area as a dense, layered meat analogue product.

4,042,716

PRESERVATIVE FOR FODDER, MIXED FODDER AND SILAGE

Heidrun Bertram, Hanau; Rudolf Fahnenstich, Mombris; Helmut Junkermann, Frankfurt; Gerhard Pohl, and Herbert Tanner, both of Hanau, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt, Germany

Continuation-in-part of Ser. No. 558,686, March 17, 1975, abandoned. This application Mar. 18, 1975, Ser. No. 559,493
Claims priority, application Germany, Mar. 16, 1974, 2412801
Int. Cl.[2] A23L *3/34;* A23B *7/14;* A23K *3/00*
U.S. Cl. 426—335 24 Claims

1. Silage containing acrylic acid, methacrylic acid or an ester or salt of acrylic acid or methacrylic acid in an amount effective to preserve the silage.

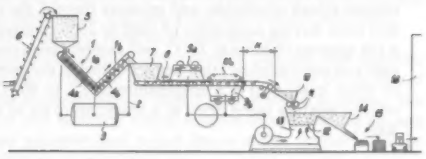
24. Fodder, mixed fodder or silage containing alfalfa as a constituent thereof and also containing acrylic acid, methacrylic acid or an ester or salt of acrylic acid or methacrylic acid in an amount effective to preserve said alfalfa containing fodder, mixed fodder or silage.

4,042,717

FREEZING RICE

Michel Gayte, 6, rue des Tournelles, 75004 Paris, France

Filed Apr. 22, 1975, Ser. No. 570,459
Claims priority, application France, Apr. 23, 1974, 74.13983
Int. Cl.[2] A23B *7/04*
U.S. Cl. 426—508 2 Claims



1. A method of processing rice grains comprising the steps of sequentially:

a. cooking said rice grains in water to cook and hydrate the interior cores and exterior peripheries of said grains;

b. directing a current of gas at a temperature below 0° C at the hydrated rice grains for a time only sufficient to freeze and dehydrate said exterior peripheries of said grains and thereby reduce the weight of said grains by approximately 5%;

c. mechanically shelling the partially dehydrated grains to separate same; and

d. freezing the separated grains completely so that both the dehydrated peripheries and hydrated cores are frozen.

4,042,718

METHOD FOR MANUFACTURING RUMINANT FEED SUPPLEMENTS COMPRISING A PROTEIN-ALDEHYDE COMPLEX

Robert M. Rawlings, and Donald Procter, both of Boise, Idaho, assignors to Commonwealth Scientific and Industrial Research Organization, Australia

Filed Dec. 22, 1975, Ser. No. 642,998
Int. Cl.[2] A23K *1/18*
U.S. Cl. 426—573 17 Claims

1. A process for producing lipid feed supplements for ruminant animals comprising:

a. forming an aqueous emulsion by admixing in an aqueous solution having the pH of at least 7.0, a proteinaceous material and a lipid material wherein the lipid material and proteinaceous material are present in a weight ratio of from about 1:1 to about 6:1;

b. contacting the emulsion with from about 0.5 to about 6

weight percent of an aldehyde, based upon the weight of the proteinaceous material, to encapsulate the lipid material within an aldehyde-protein complex, and allowing formation of a gel;

c. contacting the gel with an effective amount of acid to provide a gel having a pH of less than 6.5 for a period of time effective to allow syneresis of the gel; and

d. recovering a granular gel.

4,042,719

COMPOSITIONS OF LOW CALORY CONTENT

Zsuzsanna Zimmermann nee Ignácz, and Robert Gépész, both of Budapest, Hungary, assignors to Chinoin Gyogyszer es Vegyeszeti Termekek Gyara RT, Budapest, Hungary

Continuation of Ser. No. 335,714, Feb. 26, 1973, abandoned. This application Sept. 16, 1975, Ser. No. 613,796

Claims priority, application Hungary, Feb. 25, 1972, ZI 167; Feb. 9, 1973, CI 1340

Int. Cl.² A23L *1/04*

U.S. Cl. 426—573 **5 Claims**

1. A process for the preparation of a nutriment having a low caloric value and adapted, upon ingestion, to be highly filling to the eater, said process comprising the steps of:

a. combining an edible-carbohydrate component and a cellulose ether in a ratio by weight of substantially 0.1 to 12:1;

b. swelling the carbohydrate component and cellulose ether in water to form a swelled composition; and

c. drying the swelled composition, said cellulose ether being selected from the group which consists of methyl ethers, ethyl ethers, carboxy methyl ethers and hydroxy-substituted ethers of cellulose and mixtures thereof, the cellulose ether having a viscosity of 1000 to 3000 centipoise in a 2% aqueous solution at 20° C, said carbohydrate component and said cellulose ether being swelled in the presence of water in step (b) at a temperature of 20° to 40° C, the swelled mixture being dried at a temperature up to about 300° C.

4,042,720

CACTUS TREATMENT PROCESS AND PRODUCT

John H. Forkner, 2116 Mayfair Drive West, Fresno, Calif. 93703

Filed July 12, 1976, Ser. No. 704,537

Int. Cl.² A23L *1/06, 1/212*

U.S. Cl. 426—573 **15 Claims**

1. A process for the treatment of dry cactus pulp containing cellulosic fiber and gritty hard grain material, comprising comminuting the dry pulp to free heavier grain material from cellulosic fiber, and then separating grain material from cellulosic fiber.

4,042,721

FAST CONCHED CANDY COATING

Salvatore F. Ziccarelli, Downers Grove, Ill., assignor to Beatrice Foods Co., Chicago, Ill.

Division of Ser. No. 628,559, Nov. 3, 1975, Pat. No. 3,976,806. This application Aug. 23, 1976, Ser. No. 716,795

The portion of the term of this patent subsequent to Aug. 24, 1993, has been disclaimed.

Int. Cl.² A23G *1/16, 1/00*

U.S. Cl. 426—613 **7 Claims**

1. A conched candy coating composition comprising the ingredients of:

a. 30 to 65 parts fat; b. 40 to 65 parts sugar; c. 0 to 8 parts milk and or whey solids; d. 0 to 1 part emulsifier; e. 0 to 12 parts cocoa; f. 0 to 2 parts flavor;

wherein the ingredients have been heated to at least 150° F and mixed to a conched form by a high speed shearing and mixing wherein the shearing is by shear forces having an average shear component of 75° or greater, the particle sizes of solids in the composition are 40 microns or less and the conching time has been 30 seconds or less and thereafter cooled to prevent deterioration thereof.

4,042,722

ADDITIVES FOR ANIMAL FEEDS

Gerald J. Dunne, and John D. Harvey, both of Baie d' Urfe, Canada, assignors to Delmar Chemicals Limited, Ville La-Salle, Canada

Filed Nov. 11, 1974, Ser. No. 522,871

Int. Cl.² A23K *1/00*

U.S. Cl. 426—648 **5 Claims**

1. Process for the production of a solid livestock feed supplement comprising admixing a starch carrier in a solid form and a concentrated aqueous solution of a selenium-containing component for a period sufficient to produce a substantially homogeneous mixture, said feed supplement having a selenium content of not more than 5,000 ppm.

4,042,723

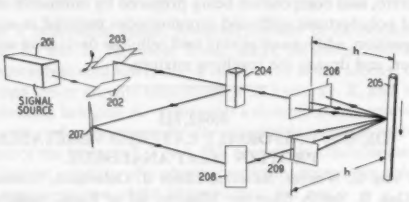
METHOD FOR MONITORING THE PROPERTIES OF PLASTIC COATINGS ON OPTICAL FIBERS

Herman Melvin Presby, Highland Park, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 12, 1976, Ser. No. 685,527

Int. Cl.² G01B *9/02*; B32B *17/04*

U.S. Cl. 427—8 **10 Claims**



1. A method for monitoring the properties of a coating on a coated optical fiber, said coating being substantially transparent, comprising the steps of:

illuminating said coated fiber with a beam of light incident to a cross-sectional axis of said fiber at a first angle;

illuminating said fiber with a beam of light incident to said cross-sectional axis at a second angle;

observing the first backscattered light pattern generated by said beam incident to said coated fiber at said first angle;

observing the backscattered light pattern generated by said beam incident to said coated fiber at said second angle;

comparing the spatial location of at least one intensity maxima in the first backscattered light pattern with the spatial location of a corresponding intensity maxima in the second backscattered light pattern; and

determining the concentricity of said fiber within said coating from said comparison.

4,042,724

METHOD FOR THE SELECTIVE ON-LINE MEASURING AND CONTROLLING OF A GEOMETRICAL PARAMETER OF ELONGATED ARTICLES

Dennis J. Nawracaj, Chicago, Ill., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Dec. 23, 1974, Ser. No. 535,599

Int. Cl.² B05D *5/00*

U.S. Cl. 427—9 **13 Claims**

1. A method of controlling a geometrical dimension related to coating thickness of each of a plurality of continuously advancing elongated articles, comprising the steps of:

coating said aarticles with a layer of coating material having a thickness that is responsively controlled by at least one adjustable operating parameter;

measuring said geometrical dimension of at least certain ones of said plurality of coated articles fluidically by respectively passing them through different substantially confined and pressurized areas that each establishes a detectable back-pressure in the presence of an article, the magnitude of which back-pressure is correlated with said geometrical dimension of the article passed therethrough;

determining fluidically whether said measured geometrical dimension of each coated article is within a predetermined acceptable tolerance range, and producing a separate process signal having a magnitude correlated with and for every measurement, and whenever any process signal indicative of any measurement is outside said tolerance range, at least momentarily substituting a reference signal representative of a nominal geometrical dimension for any such process signal;

averaging all of said process signals and any reference signals fluidically so as to form a composite control signal representative of the average of at least all of the measured geometrical dimensions that have been found to be within said tolerance range;

utilizing said composite control signal to change at least said one adjustable operating parameter, as required, to maintain said measured geometrical dimension and, thereby, the coating thickness of at least the majority of said articles within said acceptable tolerance range during said coating operation, and

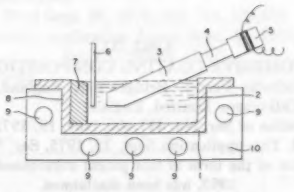
sensing each advancing coated article upstream from the point at which it is being measured for any region therealong having an abnormally large cross-sectional area, and in response to such a sensed abnormally large condition, enlarging said confined pressurized area downstream so as to allow said article region having an abnormally large cross-sectional area to freely pass therethrough, and after a pedetermined time delay re-establishing said confined area.

4,042,725

SOLDER ALLOY AND SOLDERING PROCESS

Koji Nomaki, and Yoshihito Saoyama, both of Yokohama, Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan

Filed May 24, 1976, Ser. No. 689,527
Claims priority, application Japan, May 27, 1975, 50-62467
Int. Cl.[2] C23C *1/04*
U.S. Cl. 427—57 **3 Claims**



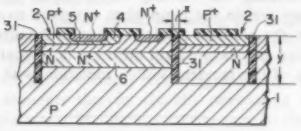
1. In a process for soldering difficulty solderable metal of iron, nickel, copper or an alloy thereof having an oxide surface, the improvement which consists essentially of preparing a bath of molten solder alloy which consists essentially of 18–80% by weight of Zn, 20–72% by weight of Sn, 0.01–0.03% by weight of Al and 0.5–3% by weight of Ag and dipping the difficulty solderable metal in the bath of molten solder alloy while applying ultrasonic vibration to the bath of molten solder alloy whereby the solder layer is formed on the surface of the difficulty solderable metal.

4,042,726

SELECTIVE OXIDATION METHOD

Tadao Kaji, Kokubunji; Tsuneaki Kamei, Mitaka, and Keiji Miyamoto, Hinode, all of Japan, assignors to Hitachi, Ltd., Japan

Filed Sept. 8, 1975, Ser. No. 611,206
Claims priority, application Japan, Sept. 11, 1974, 49-103928
Int. Cl.[2] H01L *21/306, 21/312*
U.S. Cl. 427—93 **4 Claims**



1. A method of manufacturing a semiconductor device which comprises the steps of:

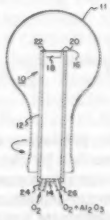
1. forming an insulating film on the principal surface of a semiconductor substrate having at least one semiconductor layer thereon,
2. forming a metallic layer on said insulating film,
3. selectively forming a mask on said metallic layer,
4. applying an etchant to the selectively formed mask and metallic layer to etch said metallic layer beneath an edge of said mask,
5. forming further metallic layer on part of the exposed insulating film so as to leave a gap between areas of metallic material on said insulating film beneath said mask,
6. removing said mask to expose said gap,
7. selectively etching said insulating film and said substrate by way of the gap in the metallic material in the surface of said insulating film to form a groove in said insulating film and said substrate which extends through said layer into said substrate and which has a width smaller than the thickness of said layer, and
8. selectively oxidizing the semiconductor material of said substrate to form an oxide insulator layer in said groove that isolates a portion of the semiconductor layer from adjacent portions of the substrate.

4,042,727

ALUMINA COATINGS FOR AN ELECTRIC LAMP

David C. Henderson, Chagrin Falls, and Kenneth M. Maloney, Shaker Heights, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 471,192, May 20, 1974, abandoned, which is a division of Ser. No. 372,069, May 21, 1973, Pat. No. 3,842,306. This application Sept. 29, 1975, Ser. No. 617,293
The portion of the term of this patent subsequent to Feb. 25, 1992, has been disclaimed.
Int. Cl.[2] B05D *5/12*
U.S. Cl. 427—107 **6 Claims**



1. A method of depositing a light diffusion coating upon the

internal untreated surface of a lamp glass envelope of an electric lamp which comprises:

a. converting a solid aluminum alkoxide compound in an oxidizing atmosphere to form a vapor of spherical alumina particles having an individual particle size range from approximately 400 Angstroms to 5,000 Angstroms in diameter,

b. suspending said vapor formed spherical alumina particles with heating in a moving gas stream, and

c. controlling the velocity flow rate of the moving gas stream within the lamp glass envelope to uniformly deposit the alumina particles upon said untreated internal surface and form a light diffusion layer scattering at least 99% of the incident visible radiation with minor lumen loss.

4,042,728

VINYL MODIFIED LIGNOCELLULOSIC PARTICLES FOR COATING PANELS

Shui Tung Chiu, New Westminster, and Tatsuhei Kaneko, Vancouver, both of Canada, assignors to Borden, Inc., Columbus, Ohio

Filed Dec. 10, 1975, Ser. No. 639,327
Int. Cl.[2] B05D *3/10, 7/02, 1/18*
U.S. Cl. 427—212 **5 Claims**

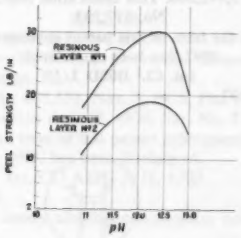
1. A process for polymerizing vinyl monomer on lignocellulosic particles including the steps of adding to an aqueous slurry of said lignocellulosic particles and aqueous solution of a salt to deposit metal ions of said salt on the surfaces and sub-surfaces of said lignocellulosic particles, the pH of the salt and slurry mixture being from 3 to 6.5 which is conducive to metal ion absorption, adjusting upwardly the pH of the salt and slurry mixture to one favorable to polymerization, adding a monomer of an alkyl ester of methacrylic acid to the mix with agitation, adding a sulfoxy compound to the mix to react with said metal ions and form free radicals which initiate polymerization of said monomer, and continuing to stir the mix at a sufficiently elevated temperature to accomplish add-on polymerization of the monomer on said lignocellulosic particles.

4,042,729

PROCESS FOR THE ACTIVATION OF RESINOUS BODIES FOR ADHERENT METALLIZATION

Joseph Polichette, South Farmingdale; Edward J. Leech, Oyster Bay, and John G. Branigan, Smithtown, all of N.Y., assignors to Kollmorgen Technologies Corporation, Dallas, Tex.

Division of Ser. No. 314,748, Dec. 13, 1972, abandoned. This application June 18, 1975, Ser. No. 587,831
Int. Cl.[2] C23C *3/02*
U.S. Cl. 427—304 **9 Claims**



1. In a process for producing a securely bonded layer of metal on a resinous surface by electroless metal deposition the improvement which comprises contacting the resinous surface, prior to electroless metal deposition, with a composition comprising water, permanganate ion and manganate ion in the molar ratio of manganate ion to permanganate ion of up to 1.2, said composition having a pH in the range of 11 to 13.

4,042,730

PROCESS FOR ELECTROLESS PLATING USING SEPARATE SENSITIZATION AND ACTIVATION STEPS

Richard Lewis Cohen, Berkeley Heights, N.J., and Ronald Lee Meek, Naperville, Ill., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 29, 1976, Ser. No. 671,034
Int. Cl.[2] C23C *3/02*
U.S. Cl. 427—305 **10 Claims**

1. A process for electroless deposition of copper on nonmetallic surfaces comprising the steps of:

a. preconditioning the nonmetallic surface so as to prepare the surface for a sensitizing and activating procedure;

b. exposing the preconditioned surface to a sensitizing solution consisting essentially of an acidified aqueous solution of tin ions;

c. activating the sensitized surface by exposing the surface to an acidified solution of palladium ions so as to produce a catalytically active surface;

d. exposing the catalytically active surface to an aqueous post-activation solution; and

e. exposing said surface to an alkaline electroless copper plating solution;

characterized in that the aqueous post activation solution consists essentially of a nonreducing alkaline agent with dissociation constant for the liberation of one hydroxyl ion greater than 10^{-5} and concentration range from 0.07 to 0.2 molar.

4,042,731

FOAMING AGENTS FOR GALVANIZING FLUXES

Dong Myung Chay, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 6, 1975, Ser. No. 629,548
Int. Cl.[2] C23C *1/12*
U.S. Cl. 427—311 **6 Claims**

1. A galvanizing flux consisting essentially of a fluxing material selected from zinc ammonium chloride double salt and a mixture of zinc chloride and ammonium chloride and sorbitol, the sorbitol being 0.2 to 1.0% by weight of the fluxing material.

4. In a galvanizing process which comprises dipping a metal article into a molten bath of zinc covered by a flux composition consisting essentially of a fluxing material selected from a mixture of zinc chloride and ammonium chloride and zinc ammonium chloride double salt the improvement wherein the fluxing materials also contain as a foaming agent sorbitol in an amount of from 0.2 to 1.0% by weight of the fluxing material.

4,042,732

COHESIVE COATING COMPOSITIONS

Andrew Nicholas Ferrar, Bridgewater, England, assignor to British Cellophane Limited, England

Continuation of Ser. No. 417,406, Nov. 19, 1973, Pat. No. 3,937,683. This application Sept. 25, 1975, Ser. No. 616,696
The portion of the term of this patent subsequent to Feb. 10, 1993, has been disclaimed.
Int. Cl.[2] C08J *3/20*; C08K *3/34*
U.S. Cl. 427—385 R **5 Claims**

1. A cohesive coating composition comprising in dispersion in a liquid a mixture of between 70 and 90% by weight of natural rubber and between 10 and 30% by weight of poly-n-butyl methacrylate in which dispersion there is incorporated between 10% and 35% by weight, based on the weight of the solids, of an inert particulate mineral material selected from the group consisting of glass and hydrated aluminum silicate having a mean particle size lying in the range between 2.0 and 20 microns.

4,042,733

FORMING SOLID, ADHESIVE-FREE COMPOSITE OF MEMBRANE FILTERS AND CELLULOSIC CARDBOARD

Karl Buchta; Mohamed Abdou, both of Ingelheim am Rhein, and Harald Woltersdorf, Konigslutter, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

Continuation of Ser. No. 592,184, July 1, 1975, abandoned. This application May 25, 1976, Ser. No. 689,792
Claims priority, application Germany, July 4, 1974, 2432049
Int. Cl.[2] B05D *3/02*
U.S. Cl. 427—391 5 Claims

1. The method of forming a solid, adhesive-free, layered composite material composed of two clearly defined layers consisting of a membrane filter layer and a porous backing layer, comprising the steps of depositing on cellulosic cardboard a layer of a gelatinized polymeric membrane-forming substance between onset of synerisis and final solidification thereof, and allowing said membrane-forming substance to solidify on said cellulosic cardboard.

3. The method of claim 1, where said cellulosic cardboard is impregnated with a nutrient solution for microorganisms.

4,042,734

METHOD FOR SPRAY COATING

Richard F. Wiggins, Fairfield, Conn., assignor to The Gyromat Corporation, Stratford, Conn.

Filed Dec. 2, 1975, Ser. No. 637,019
Int. Cl.[2] B05D *1/02*
U.S. Cl. 427—424 17 Claims

1. A process for spray coating of irregularly shaped articles, which comprises

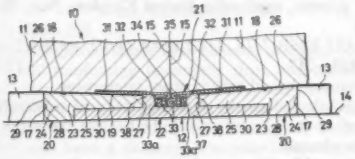
a. progressively conveying the articles along a conveying axis through a substantially enclosed spray chamber,
b. directing one or more spray fans of coating material toward said article,
c. rotating said spray fans about a rotational axis disposed at a large angle to the conveyance axis,
d. said spray fans being directed at a substantial angle with respect to the axis of rotation thereof,
e. reciprocating said spray fans along a reciprocation axis at a substantial augle to said conveying axis,
f. said spray fans being rotated at a rate such, in relation to the speed of reciprocation and the speed of conveyance, that said spray fans described tight prolate cycloids in which the effective ratio of rolling circle radius to tracing point radius (*a/b*) is 1 to at least about 5.

4,042,735

CARPET CONSTRUCTION

Kiyoo Yoneya, Kurobe, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Sept. 20, 1976, Ser. No. 724,650
Claims priority, application Japan, Sept. 30, 1975, 50-134214
Int. Cl.[2] D04H *11/00*
U.S. Cl. 428—33 5 Claims



1. A carpet construction comprising:

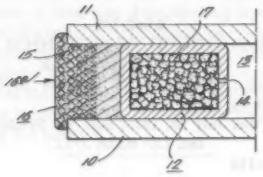
a. A pair of sheet materials having their opposed ends disposed in abutting engagement with each other;
b. a pair of undercushioning members secured respectively to reverse surfaces of said sheet materials, said undercushioning members terminating short of said abutting ends to provide a longitudinal recess therebetween;
c. a sliding clasp fastener having a pair of stringer tapes carrying along their inner longitudinal edges rows of interengageable fastener elements, said stringer tapes being secured to the reverse surfaces of said sheet materials immediately adjacent to the abutting ends thereof, said rows of fastener elements being coupled together, and said coupled rows of fastener elements being located in said longitudinal recess; and
d. a protective member extending along the length of said sliding clasp fastener and covering said coupled rows of fastener elements, and said protective member having a longitudinal groove snugly receiving said coupled rows of fastener elements therein, thereby preventing the same from displacement in a direction transverse to the longitudinal axis of said sliding clasp fastener.

4,042,736

INSULATING GLASS UNITS

Theodore R. Flint, Jug Hollow Road, Valley Forge, Pa. 19481

Division of Ser. No. 626,230, Oct. 28, 1975, Pat. No. 3,998,680. This application Oct. 1, 1976, Ser. No. 728,873
Int. Cl.[2] E06B *3/24, 3/26, 3/28*
U.S. Cl. 428—34 2 Claims



1. An insulating glass unit comprising glass panes held in a predetermined spaced relation by a spacing member disposed between the panes of glass adjacent to the edges thereof and cooperating to provide a channel about the periphery of the assembly and a partially crosslinked hot-melt butyl rubber sealant composition in said channel in contact with said glass panes and spacing member, sufficient heat having been applied to the exterior face of the sealant composition to raise the temperature of the outermost portion of the sealant composition to above from about 325° F. to about 425° F. while the innermost portion of the sealant composition remained at a temperature substantially below from about 325° F. to about 425° F. to cause substantially complete crosslinking of that portion of the sealant composition heated above from about 325° F. to about 425° F. thereby forming a high-strength thermoset adhesive bond about the outer periphery of the channel, while the innermost portion of the sealant composition adjacent the spacing member remained uncrosslinked and provides a high tack, thermoplastic adhesive bond about the inner periphery of the channel.

4,042,737

PROCESS FOR PRODUCING CRIMPED METAL-COATED FILAMENTARY MATERIALS, AND YARNS AND FABRICS OBTAINED THEREFROM

Klane F. Forsgren, Yardley; Sidney Melamed, Elkins Park, both of Pa., and Robert S. Weiner, Marietta, Ga., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 415,916, Nov. 14, 1973, abandoned, which is a continuation of Ser. No. 263,808, June 19, 1973,
abandoned, which is a continuation of Ser. No. 76,246, Sept. 28, 1970, abandoned. This application Apr. 1, 1975, Ser. No. 564,186
Int. Cl.[2] B05D *5/12;* D02G *1/00*
U.S. Cl. 428—96 16 Claims

1. A process for producing a textured multi-filament yarn

suitable for use in the production of textiles having an enhanced resistance to the accumulation of electrostatic charges, said process comprising:

knitting a continuous filamentary material, suitable for use in carpet fiber or carpet yarn, to form a knitted fabric therefrom,

depositing an electrically conductive oxidatively stable and non-toxic metal coating on said knitted fabric,

deknitting the coated fabric to provide a textured, coated filamentary material, and

incorporating said textured, coated filamentary material in a textured multifilament yarn,

and wherein, after the metal coating step, the knitted fabric, deknitted filamentary material, or textured multifilament yarn is heat-treated such that shrinkage of the filamentary material according to the Leesona Skein Shrinkage test is no more than 1–5% measured after one hour.

9. A textured multifilament yarn, suitable for use in the manufacture of textiles having an enhanced resistance to the accumulation of electrostatic charge, produced in accordance with the process of claim **1**.

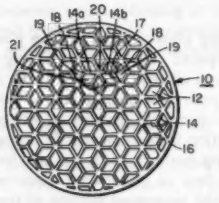
13. In a carpet characterized by a static electrical buildup of substantially less than 10,000 volts, the improvement comprising forming at least a portion of the pile thereof with the textured multifilament yarn of claim **9**.

4,042,738

HONEYCOMB STRUCTURE WITH HIGH THERMAL SHOCK RESISTANCE

Suresh T. Gulati, Elmira, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed July 28, 1975, Ser. No. 599,624
Int. Cl.² B32B *3/12*
U.S. Cl. 428—116 **8 Claims**



1. A ceramic honeycomb structure having improved thermal shock resistance comprising, a plurality of interconnected partitions extending longitudinally along the longitudinal extent of said honeycomb structure within a bounding wall portion and forming a plurality of cells or passageways extending longitudinally therethrough, said cells having a diamond shape when viewed in a plane transverrse to the longitudinal extent of said honeycomb structure, and said interconnected partitions being discontinuous in any one direction within said plane such that no continuous unidirectional partition extends transversely across said honeycomb structure within such plane.

4,042,739

JOINT TAPE FOR DRY WALL CONSTRUCTION HAVING WATER-INITIATED ADHESIVE WHICH ONCE ACTIVATED, ATTACHED TO, AND DRIED ON A SURFACE RESISTS REMOVAL UNDER REMOISTENING CONDITIONS

Earl A. Emal, P.O. Box 377, Commerce City, Colo. 80022, and Jeck L. Lambert, 114 S. 12th St., Brighton, Colo. 80601

Filed Nov. 3, 1976, Ser. No. 738,307
Int. Cl.² B32B *3/24, 3/26;* C09J *7/04*
U.S. Cl. 428—137 **3 Claims**

1. A joint tape for covering and sealing the joints between adjacent wall board panels comprising:

a thin, parallel sided, elongated strip of water absorbing paper tape; and

a dried, water moistenable, polyvinyl acetate-based adhesive layer applied to completely cover the surface area of one side of said tape whereby the adhesive layer may be moistened with water to activate the adhesive layer so that the tape may be applied directly to the wall board joint to seal adjacent wall board panels together, said joint tape being further characterized in that after being moistened and applied to said panels and dried, the tape cannot be removed by remoistening the adhesive layer.

2. A joint tape as defined in claim **1**, wherein:

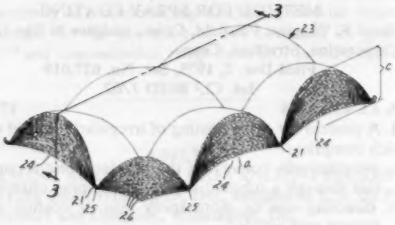
said paper tape is perforated with a series of holes in longitudinal rows along the central portion of the strip.

4,042,740

REINFORCED PILLOWED MICROFIBER WEBS

Dennis L. Krueger, Hudson, Wis., assignor to Minnesota Mining and Manufacturing Company, St.Paul, Minn.

Filed Sept. 20, 1974, Ser. No. 507,878
Int. Cl.² B32B *3/10*
U.S. Cl. 428—138 **16 Claims**



1. A low-density web comprising 1) a mesh of filaments and 2) a coherent mass of blown microfibers arranged into a network of compacted high-density regions and pillowed low-density regions, the compacted regions being in registration and engagement with the filaments of said mesh, and the pillowed regions spanning the space between adjacent compacted regions, with microfibers arching outwardly from their level in a compacted region into a pillowed region, whereby in a free-standing condition of the mass the pillowed regions are displaced to one side of a plane defined by the base of the compacted regions and have an expanded and arched configuration in which the span length from compacted region to compacted region of the most highly arched microfibers is greater than that of less highly arched microfibers.

4,042,741

CHANNEL-SHAPED FLEXIBLE SEALING STRIPS

Robert G. Bright, Viersen, Germany, assignor to Draftex Development AG, Switzerland

Filed Nov. 3, 1975, Ser. No. 628,201
Claims priority, application United Kingdom, Nov. 20, 1974, 50239/74
Int. Cl.² E06B *7/18, 7/22;* E04F *19/02;* B32B *15/06*
U.S. Cl. 428—217 **17 Claims**

1. A channel-shaped sealing strip, comprising

a channel-shaped carrier member made of relatively rigid material but designed so as to be flexible about the length of the channel,

a covering of flexible material over the outside surface of the carrier member and extending over the distal edges of the side walls of the carrier member and over at least part of the inside surfaces thereof,

the said flexible material defining gripping ribs extending longitudinally along the inside surface of the channel and projecting toward each other from the opposite side walls thereof,

at least part of the said material on one side wall of the carrier member being of relatively hard flexible material which is placed directly onto the carrier member,

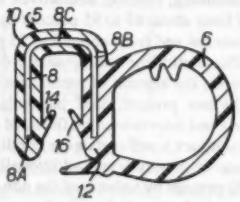
at least part of the flexible material on the other side wall of the carrier member being of relatively softer flexible material which is placed directly onto the carrier member,

the relatively hard and relatively softer materials not overlapping each other, and

a beading running along the outside of the channel and defined by the relatively softer flexible material.

10. A method of making a channel-shaped sealing strip, comprising the steps of

extruding flexible covering material in relatively hard and relatively soft forms directly onto different regions of a longitudinally extending carrier member so as together they completely cover one surface thereof and join along a line extending longitudinally of that surface, the lateral edges of the carrier member and at least the marginal



regions of the other surface of the carrier member being also directly covered by the extruded flexible covering material, at least part of this material being in the relatively soft form,

the material in the relatively soft form on the said one surface additionally being extruded to provide a beading extending longitudinally of the carrier member parallel to the said line,

the material on the said other surface additionally being extruded to provide ribs extending longitudinally of the carrier member parallel to the said line,

the said regions being such that, with the carrier member shaped into channel form, the outside surface of one side wall of the channel so formed is covered by the material in the relatively soft form, the beading runs along this outside surface, the outside surface of the other side wall of the channel is covered by the material in the relatively hard form, and the gripping ribs run along the inside surfaces of the side walls of the channel.

4,042,742

REINFORCING ELEMENT FOR FLEXIBLE STRUCTURES, IN PARTICULAR PNEUMATIC TIRES

Luciano Bergomi, Milan, Italy, assignor to Industrie Pirelli S.p.A., Milan, Italy

Filed Mar. 30, 1971, Ser. No. 129,613
Claims priority, application Italy, Mar. 31, 1970, 22692/70
Int. Cl.² D04H *1/74*
U.S. Cl. 428—295 **11 Claims**

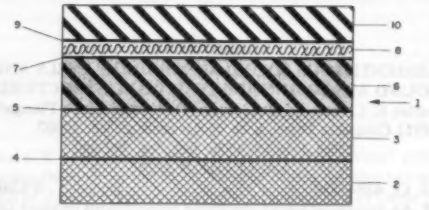
1. An elongated rubber base element designed for forming part of and reinforcing pneumatic tires, and consisting of a rubber compound matrix and of individual fibers evenly dispersed therein, wherein said fibers consist of a mineral material having a tensional modulus of elasticity of at least 5,000 Kg/mm² and have a diameter comprised between 0.002 and 0.02 mm, the diameter to length ratio of said individual fibers being comprised between 1/10 and 1/100, their length being in any case not less than 0.1 mm, the amount of said fibers being comprised between 2 and 30 percent by weight of the weight of said matrix, the major part of said fibers being embedded and arranged in said matrix in essentially parallel relationship to one another in a direction essentially perpendicular to the smallest dimension of said element, the resistance of said element to compressional stress in said direction being substantially higher than that of a like element consisting solely of the said rubber compound matrix.

4,042,743

COMPRESSIBLE OFFSET PRINTING BLANKET

Charles E. Larson, Attleboro, Mass., assignors to Uniroyal, Inc., New York, N.Y.

Continuation of Ser. No. 45,469, June 11, 1970, abandoned. This application Feb. 2, 1976, Ser. No. 654,190
Int. Cl.² B41N *9/00*
U.S. Cl. 428—306 **7 Claims**



1. A laminated printers' blanket comprising a layer having a printing surface, at least one strengthening layer, and a compressible layer of a cellular resilient polymer between the layer having the printing surface and the strengthening layer, the cells of the cellular resilient polymer including resinous hollow microspheres in the polymer matrix, each surface of said compressible layer having a substantially planar surface when said blanket is in a flat position.

4,042,744

MULTIPLE-COLOR TRANSFER ELEMENTS AND PROCESS

Douglas A. Newman, and Allan T. Schlotzhauer, both of Glen Cove, N.Y., assignors to Columbia Ribbon and Carbon Manufacturing Co., Inc., Glen Cove, N.Y.

Continuation-in-part of Ser. No. 213,534, Dec. 29, 1971, abandoned. This application May 14, 1973, Ser. No. 360,334
Int. Cl.² B41C *1/06*
U.S. Cl. 428—307 **11 Claims**

1. Process for producing a pressure-sensitive multicolor liquid ink-releasing transfer element comprising the steps of:

a. preparing a composition comprising a heat-activatable solid blowing agent, a dispersed granulated solid which is soluble in a volatile liquid, a synthetic thermoplastic film-forming resin and a volatile liquid solvent for said resin which is a non-solvent for said dispersed granulated solid;

b. coating said composition as a thin layer and evaporating said solvent to form a solidified layer of said resin containing said blowing agent and dispersed granulated solid;

c. heating said solidified layer to activate and remove said blowing agent from said layer to form a dry microporous layer of said resin containing said dispersed granulated solid;

d. treating and dry microporous layer with a volatile liquid which is a solvent for said dispersed granulated solid but is a non-solvent for said resin, to dissolve and remove said dispersed granulated solid and form a microporous layer of said resin containing empty, interconnected pores capable of absorbing a liquid ink;

e. impregnating one area of said microporous layer with a liquid ink having one color and comprising a non-drying oil and coloring matter; and

f. impregnating another area of said microporous layer adjacent said one area with a liquid ink having a different color and comprising a non-drying oil and coloring matter, to provide a transfer element capable of exuding said different colored inks under the effects of imaging pressure applied to said different areas.

4,042,745

CEMENTITIOUS SOUND ABSORBING PANELS AND SOUND ABSORBING SPRAYED WALL STRUCTURES

Charles E. Cornwell, 7104 Marlan Drive, and Mark Plunguian, 6912 Columbia Drive, both of Alexandria, Va. 22307

Filed July 14, 1976, Ser. No. 705,335
Int. Cl.[2] B32B *3/26*
U.S. Cl. 428—310 8 Claims

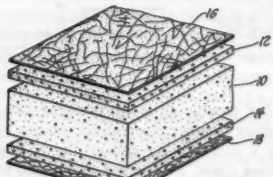
1. An acoustical sound-absorbing cementitious product composed of hydraulic cement, selected from the group comprising portland cement, calcium aluminate cement, and gypsum cement, of lightweight aggregate and of foamed air cells, with a range of dry densities of 20–40 pounds per cubic foot, having an interior interconnecting cellular structure and an impervious surface with perforations providing open space accounting for at least 10% of the surface area, giving the sound waves access to the interior open cell structure.

4,042,746

COMPOSITE MATERIAL AND METHOD OF FORMING

Peter H. Hofer, Grosse Pointe Farms, Mich., assignor to The John Z. DeLorean Corporation, Bloomfield Hills, Mich.

Filed Nov. 7, 1975, Ser. No. 630,056
Int. Cl.[2] B32B *3/26*
U.S. Cl. 428—311 4 Claims



1. A composite structure comprising a rigid closed-cell core element, an initially resilient open-cell foam material overlaying at least one face of said core element, a layer of high-strength reinforcing material overlaying said open-cell foam material, a polymerizable resinous material impregnating the open-cell material, said resinous material having been cured while maintaining the structure under sufficient compression to substantially reduce the thickness of the initially resilient foam to thereby substantially fill the open cells and extrude excess resinous material from the compressed layer to bond the high-strength reinforcing material to the rigid closed-cell core element without significant permeation of the closed-cell core element.

4,042,747

GASKET AND SEALING STRUCTURES OF FILLED POLYTETRAFLUOROETHYLENE RESINS

Ernest J. Breton, Wilmington; Dexter Worden, Newark, and Melville E. Pugh, Jr., Wilmington, all of Del., assignors to Joseph A. Teti, Jr. and William C. Teti, both of Philadelphia, Pa., part interest to each

Filed Mar. 14, 1975, Ser. No. 558,344
Int. Cl.[2] B32B *5/16, 27/00*
U.S. Cl. 428—323 6 Claims

1. A self-sustaining, flexible, non-woven material consisting essentially of from about 65 to 95 percent by volume of a solid particulate material and from about 5 to 35 percent by volume of polytetrafluoroethylene resin, said volume percentages being based upon the amount of particulate material and polytetrafluoroethylene present, said particulate material being interconnected and intertwined by fibrils of said polytetrafluoroethylene to impart a self-sustaining condition and flexibility to the non-woven material, and additionally containing from about 40 to 60 percent by volume of the non-woven material to grease, said grease having a viscosity between about 10 to 1000 poises at temperatures between about 10 and 150° C. and being uniformly distributed throughout the non-woven material, said non-woven material having been prepared by mechanically working a mixture of said particulate material, polytetrafluoroethylene and grease until fibrillation of the polytetrafluoroethylene occurs and the resulting fibrils interconnect and intertwine the particulate material.

4,042,748

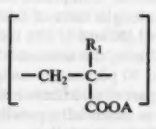
PROCESS FOR IMPROVING COATING COMPOSITIONS FOR PAPER AND PAPER SUBSTITUTES BY USE OF POLY(HYDROXYALDEHYDOCARBOXYLATE) DISPERSING AGENT

Gerhard Hebbel, Traisa; Horst Krueger, Darmstadt; Heinz Haschke, and Gerhard Morlock, both of Grossauheim, all of Germany, assignors to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler, Frankfurt am Main, Germany

Filed July 24, 1973, Ser. No. 382,225
Claims priority, application Germany, July 26, 1973, 2236595
Int. Cl.[2] C08L *81/00;* B32B *5/16;* C09C *3/10*
U.S. Cl. 428—323 16 Claims

1. Process for coating paper or paper substitutes, said process comprising applying to said paper or paper substitutes a composition containing solid, organic or inorganic coloring particles or mixtures thereof, in a system comprised mainly of water, wherein at least about 50% of weight of said particles or mixtures thereof have a maximum diameter of about 50μm, said composition containing about 0.05–5.0% by weight of a dispersing agent, related to the weight of solid substance in said composition, said dispersing agent consisting essentially of at least one polymer having an average degree of polymerization of about 10–500, said polymer derived from:

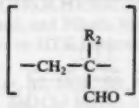
a. Y + W/2 mole percent units of the formula



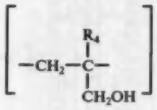
(I)

b. U − W mole percent units of the formula

(II)

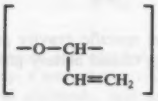


c. W/2 mole percent units of the formula



d. V mole percent units of the formula

(V)



in which U is 12 – 47, V is 1 – 25, W is O – U and Y is [100 – (U + V)]; A is an alkali metal, hydrogen or ammonium ion; R_1 signifies hydrogen, methyl, hydroxy methyl, ethyl, chlorine or bromine, R_2 and R_4 are the same or different and signify hydrogen or hydroxy methyl; and further, when W is not equal to zero, the quotient of mole percent carboxyl or carboxylate groups to mole percent hydroxyl groups is 2 – 16.

4,042,749

ARTICLE HAVING ABRASION RESISTANT SURFACE FORMED FROM THE REACTION PRODUCT OF A SILANE AND A METAL ESTER

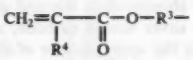
Timothy C. Sandvig, Woodville, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation of Ser. No. 513,116, Oct. 8, 1974, abandoned. This application Oct. 4, 1976, Ser. No. 728,932

Int. Cl.[2] B32B *27/36*

U.S. Cl. 428—412 **18 Claims**

1. An insoluble, abrasion-resistant, film consisting of the reaction product of (a) a reactive silane of the formula $R_a^1—Si—R_{4-n}$, wherein R^1 is selected from the group consisting of $CH_2=CH—$, an alkyl group of from 2 to 10 carbon atoms containing an epoxy group, an alkyl ether epoxide group containing up to 10 carbon atoms, and



wherein R^3 is an alkylene group having from 1 to 8 carbon atoms, and R^4 is hydrogen or an alkyl radical having from 1 to 8 carbon atoms; R^2 is an alkoxy or acetoxy group, n is a positive integer of 1 to 3; and (b) a metal ester of the formula $M(OR)_x$, wherein M is selected from the group consisting of titanium, aluminum, and zirconium; R is an alkyl radical having from 1 to 8 carbon atoms, and *x* is equal to the number of valence bonds of M.

4,042,750

PRODUCTS AND PROCESS FOR PREPARATION OF POLYAMIDES AND SHAPED ARTICLES THEREFROM

Robert B. Hanson, Aurora, and James R. Stephens, Naperville, both of Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

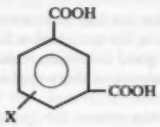
Continuation-in-part of Ser. No. 348,869, April 9, 1973, Pat. No. 3,959,233. This application May 29, 1975, Ser. No. 581,818

Int. Cl.[2] B32B *15/02, 15/08, 27/34*

U.S. Cl. 428—423 **26 Claims**

(IV)

12. A process for preparing high moluecular weight polyamide polymers having film forming properties which process comprises condensing an aromatic diacid of the formula



where X is hydrogen, nitro, or an alkyl or alkenyl radical having about six or less carbon atoms, with a diamine in a mole ratio of about 1:0.5 to about 1:0.9 at a temperature of about 210° to about 250° C., to give a low molecular weight polymer having an excess of carboxylic acid moieties and then further condensing this polymer with about 0.1 up to about 0.75 moles of diisocyanate for each diacid moiety in an inert solvent at a temperature of about 25° to about 150° C.

25. A laminate having a plurality of layers bonded together with the polyamide prepared according to the process of claim **12.**

4,042,751

MOULDED PANEL AND THE METHOD OF ITS MANUFACTURE

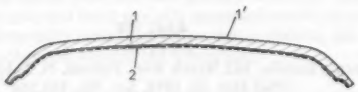
Jacques Roth, 13, quai Mullenheim, Strasbourg (Bas-Rhin), France

Filed Jan. 6, 1976, Ser. No. 646,929

Claims priority, application France, Feb. 5, 1975, 75.05063

Int. Cl.[2] B32B *27/40, 3/26*

U.S. Cl. 428—425 **6 Claims**



1. A method of manufacturing shaped panels, comprising impregnating selected portions of a flexible sheet of foamed polyurethane with a polymerizable mixture of isocyanate, polyol, catalyst and a diluent, placing said sheet in a mold, closing the mold in order to impart to the sheet a predetermined desired shape, opening the mold and removing the sheet from the mold when the polymerizable mixture has polymerized, thereby to produce a flexible sheet having different degrees of flexibility over different areas of the sheet.

6. A shaped panel of varying flexibility produced by the method of claim **1.**

4,042,752

MULTIPLE METALLIC LAYERS INCLUDING TIN-COBALT CONTAINING ALLOY LAYER, WITH PLASTIC SUBSTRATE

Jacob M. Hage, Farmington, Mich., assignor to M.C.P. Industries, Inc., Troy, Mich.

Continuation-in-part of Ser. No. 432,862, Jan. 14, 1974, Pat. No. 3,926,569, which is a division of Ser. No. 249,850, May 3, 1972, Pat. No. 3,884,116, which is a continuation-in-part of Ser. No. 208,080, Dec. 15, 1971, abandoned. This application Dec. 15, 1975, Ser. No. 640,713

The portion of the term of this patent subsequent to Dec. 16, 1992, has been disclaimed.

Int. Cl.[2] B32B *15/08*

U.S. Cl. 428—626 **18 Claims**

1. A product means for use in interior as well as exterior applications, such as in the automotive field and the like, and operative to provide good corrosion resistance properties, and being of satin-like lustrous or shiny appearance, comprising in sequence,

a. a plastic substrate means for generally supporting the product means and being operative to receive and support a plurality of metallic layers thereon,

b. zero up to about 0.0005 inches thickness of a layer means of a material selected from the group consisting of copper and copper alloys.

c. layer means selected from at least one material of the group consisting of nickel, cobalt, and nickel-cobalt alloys, having a thickness between about 0.0001 and about 0.001 inches,

d. layer means of at least one material selected from the group consisting of a tin/nickel alloy, a tin/cobalt-nickel alloy, or a tin/cobalt alloy, said layer means having a thickness between about 0.000005 and about 0.00020 inches,

said layer means being for the most part applied by electrolytic coating process and being operative to enable good corrosion resistance properties and good adhesion properties.

4,042,753

COMPOSITE CONDUCTOR

Frank Smith, Runcorn, England, assignor to Imperial Chemical Industries Limited, London, England

Division of Ser. No. 395,595, Sept. 10, 1973, Pat. No. 3,991,929. This application Sept. 16, 1976, Ser. No. 723,897

Claims priority, application United Kingdom, Sept. 22, 1972, 43897/72

Int. Cl.[2] B32B *15/20*

U.S. Cl. 428—651 **17 Claims**

1. A conductor comprising a tubular sheath of titanium, zirconium or tantalum or an alloy of one of these metals, said sheath having at least one core element of another metal inserted therein and bonded thereto and having a coating of tinning metal or alloy thereon.

4,042,754

BATTERY

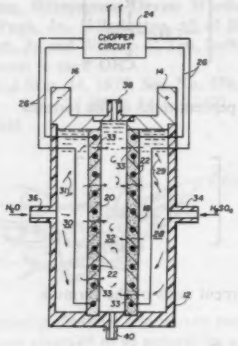
Domenic Borello, 142 Nyack Ave., Pelham, N.Y. 10803

Filed Oct. 20, 1976, Ser. No. 734,316

Int. Cl.[2] H01M *10/04, 10/06*

U.S. Cl. 429—10 **4 Claims**

1. An improved battery comprising an outer housing bounding an internal battery compartment, and a cooperating negative and positive pair of battery plates disposed in spaced apart relation in said battery compartment so as to subdivide same into a central electrolyte mixing compartment and separate first and second electrolyte inlet compartments on opposite sides thereof, each said negative and positive battery plate being comprised of a porous construction material for permitting the continuous flow of electrolyte components from said inlet compartments into said mixing compartment in accordance with a selected specific gravity of the electrolyte mixture in said central compartment optimum for electrical conductivity, whereby the maintaining of said elecrolyte mixture



at said selected optimum specific gravity promotes effective charging and discharging of said battery plates.

4,042,755

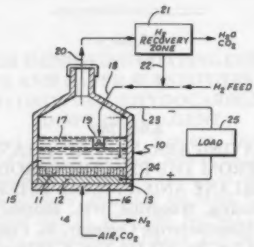
METHOD AND APPAPARATUS FOR ELECTROCHEMICAL GENERATION OF POWER FROM HYDROGEN

Michael Anbar, 960 Ilima Way, Palo Alto, Calif. 94306

Filed Nov. 10, 1975, Ser. No. 630,337

Int. Cl.[2] H01M *8/18*

U.S. Cl. 429—16 **8 Claims**



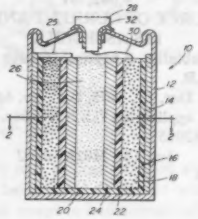
1. An apparatus for the continuous generation of an electromotive force from hydrogen which comprises in combination, an enclosed electrochemical vessel, a silver screen cathode disposed along a lower surface of the vessel, conduit means disposed for passing air and carbon dioxide from outside the vessel to the silver screen cathode, nitrogen conduit means disposed for discharging from the vessel nitrogen from the introduced air, a porous sintered alumina disk impregnated with molten salt, said molten salt being immobilized by capillary forces in said alumina disk, the said alumina disk being disposed over the silver screen cathode, a layer of molten metal supported on the upper surface of the alumina disk, a free-flowing molten alkali metal carbonate layer supported over the molten metal layer, hydrogen conduit means disposed for passing hydrogen fuel to the molten alkali metal carbonate layer, a vent for passage of gases from the vessel to a hydrogen recovery zone, a first electrical connection leading from the molten metal layer serving as an anode, and a second electrical connection leading from the silver screen cathode, said first and second electrical connections being electrically joined to a load.

4,042,756

ELECTROCHEMICAL CELLS

Franz Goebel, Ashland, and Nikola Marincic, Winchester, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Apr. 12, 1976, Ser. No. 676,073
Int. Cl.[2] H01M 6/14
U.S. Cl. 429—94 17 Claims



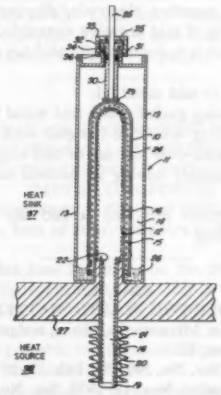
1. An electrochemical cell comprising a first, central electrode of one polarity; a second electrode of the same polarity as said first, central electrode, said second electrode being disposed around said first, central electrode but not in mechanical contact therewith; a third electrode of a polarity opposite to said first and second electrodes, said third electrode being disposed between said first and second electrodes but not in mechanical contact therewith; and an electrolytic solution between and in contact with said first, second and third electrodes, said first and second electrodes of the same polarity being greater in number than the number of electrodes of the polarity opposite to the first polarity.

4,042,757

THERMO-ELECTRIC GENERATORS

Ivor Wynn Jones, Chester, England, assignor to Chloride Silent Power Limited, England

Filed Apr. 5, 1976, Ser. No. 673,556
Claims priority, application United Kingdom, Apr. 10, 1975, 14863/75
Int. Cl.[2] H01M 4/36
U.S. Cl. 429—104 19 Claims



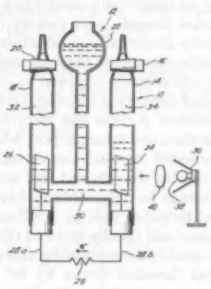
1. A thermo-electric generator comprising outer and inner tubes formed of metal and constituting a first electrode, the inner tube having a closed end within the outer tube and, remote from the closed end being secured to the outer tube to form an annular region between the two tubes, sodium in this annular region, which sodium, when the generator is operating, is partly liquid and partly vapor, a beta alumina ceramic electrolyte tube having a closed end positioned within the outer tube and over the inner tube so that the open end of the ceramic tube dips into the liquid sodium in said annular region when the tubes are in an upright position with the closed end of the inner tube above the point where the inner and outer tubes are joined, the ceramic tube thereby separating two regions containing sodium liquid and vapor, a heat source and heat sink, the heat sink being arranged to cool either the inner tube or the outer tube and to cool also the region where the two tubes are joined and the heat source being arranged to heat the other of these two tubes, whereby a temperature difference is maintained between the regions inside and outside the electrolyte tube, the electrolyte tube, on part of its surface exposed to sodium vapor and facing the cooled tube, having a conductive coating which is porous to sodium and which constitutes a second electrode, a current output lead connected to said conductive coating, and means for recirculating condensed sodium from the region between the electrolyte and the cooled tube to the surface of the electrolyte facing the heated tube, whereby an electric potential is developed between said output lead and the metal inner and outer tubes which constitute a second electrical output conductor.

4,042,758

PHOTOCHEMICAL CELL

David H. Weinstein, Brookshire; Joe W. Keeney, Houston, both of Tex., and Gregory M. Haas, McLean, Va., assignors to The Superior Oil Company, Houston, Tex.

Filed Nov. 3, 1975, Ser. No. 628,083
Int. Cl.[2] H01M 6/30; C25B 1/02
U.S. Cl. 429—111 7 Claims



1. In a photochemical cell of the type utilizing an alkaline electrolyte solution, a cathode in contact with said electrolyte, and an anode of titanium dioxide in contact with said electrolyte to produce electric current from light energy, the improvement which comprises:

said cathode bieng selected from a group consisting of platinum and gold and being partially immersed in said electrolyte and partially exposed to an oxygen-containing gas.

2. A photochemical electric cell comprising:

a container;

an electrolyte of approximately five normal aqueous potassium hydroxide solution in said container;

an anode of titanium metal at least partially immersed in said electrolyte and having formed thereon a surface film of titanium dioxide;

a cathode selected from the group consisting of platinum and gold, said cathode being partially immersed in said electrolyte and partially exposed to an oxygen-containing gas whereby oxygen gas is evolved at said anode during operation of said cell;

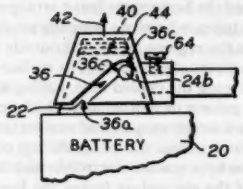
conductor means attached to said anode and said cathode for forming an electric circuit therebetween; and

means for exposing the titanium dioxide film on said anode to light.

4,042,759
BATTERY QUICK DISCONNECT SYSTEM

Alexander Cella, Robinwood Drive, Great Notch, N.J. 07013

Filed Aug. 25, 1975, Ser. No. 607,098
Int. Cl.[2] H01M 2/30
U.S. Cl. 429—121 7 Claims

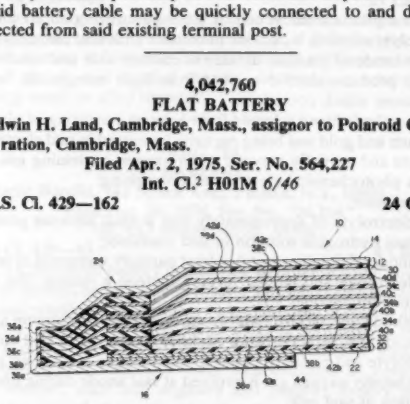


1. In a disconnect system having a battery cable and an existing unthreaded battery terminal post to which said battery cable is removably connected; the improvement comprising a threaded hollow sleeve member fixedly secured about said existing terminal post to convert said existing unthreaded terminal post into a threaded terminal post, said threaded terminal post having an electrically conductive exterior portion electrically connected to said existing unthreaded terminal post, and a molded hollow socket body having interior threads therein complimentary to the threads on said fixedly secured threaded sleeve and lockably threadably engageable therewith, said hollow socket body being threadably removably mounted on said fixedly secured threaded sleeve with said interior threads engaging said complimentary threads, said socket body further having an electrically conductive interior portion adjacent said interior threads, said battery cable extending from said socket body electrically conductive interior portion and being electrically connected thereto, said electrically conductive interior portion being disposed in electrically conductive contact with said converted threaded terminal post electrically conductive exterior portion and electrically therethrough to said existing unthreaded terminal post when said socket body is threadably mounted on said converted threaded post, said socket body interior threads and said sleeve threads comprising locking threads for releasably locking said socket body to said converted threaded post by a 90° rotation of said hollow socket body onto said fixedly secured threaded sleeve in a first direction and quickly disconnecting said socket body from said fixedly secured threaded sleeve by 90° rotation in a second direction opposite to said first direction, whereby an existing battery terminal post may be converted into a system in which said battery cable may be quickly connected to and disconnected from said existing terminal post.

4,042,760
FLAT BATTERY

Edwin H. Land, Cambridge, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Apr. 2, 1975, Ser. No. 564,227
Int. Cl.[2] H01M 6/46
U.S. Cl. 429—162 24 Claims



1. In a planar battery of a variety having at least one cell including positive and negative electrodes and a planar electrolyte ion permeable separator positioned therebetween, the improvement wherein at least one of said electrodes is formed comprising:

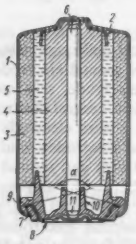
a planar current collector having a surface for association with active electrode material; and

an aqueous slurry of active electrode material particles in aqueous electrolyte, said slurry including an inorganic substantially nonconductive particulate dispersant.

4,042,761
CHEMICAL SOURCE OF CURRENT AND METHOD FOR ITS ASSEMBLY

Faat Khatovich Nabiullin, 3 Mytischinskaya ulitsa, 14a, kv. 90, Moscow, U.S.S.R.

Filed Dec. 17, 1975, Ser. No. 641,575
Claims priority, application U.S.S.R., Dec. 24, 1974, 2082916; Dec. 24, 1974, 2082915
Int. Cl.[2] H01M 6/02
U.S. Cl. 429—165 5 Claims



1. A chemical source of current, comprising: a casing with a bottom;

a first insulating gasket placed on said bottom of said casing;

a positive electrode arranged in said casing;

an axial through cavity in said positive electrode;

a negative electrode disposed in said axial through cavity of said positive electrode on said first insulating gasket;

an axial through cavity in said negative electrode;

an ion-conducting diaphragm arranged between said positive and negative electrodes and manufactured simultaneously with said negative electrode;

a tap for said negative electrode, disposed in said axial through cavity of said negative electrode;

a metal lid which is in contact with said tap of said negative electrode;

holes provided in said metal lid;

a second insulating gasket under said metal lid;

a sealing coupling which is integral with said insulating gasket and fitted over said tap of said negative electrode;

said sealing coupling having an internal surface engaging said tap;

at least one groove provided in said tap to receive said sealing coupling.

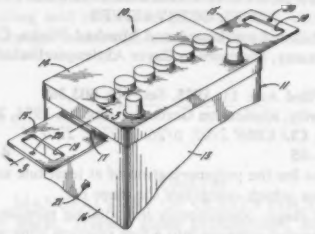
4,042,762
HANDLE FOR PLASTIC BATTERIES

Duane D. Hakarine, Minneapolis, Minn., assignor to Gould Inc., Rolling Meadows, Ill.

Continuation of Ser. No. 549,153, Feb. 12, 1975, abandoned.
This application Nov. 11, 1975, Ser. No. 630,804
Int. Cl.[2] H01M 2/02
U.S. Cl. 429—187 4 Claims

1. A storage battery having a box-like case made of plastic, straps molded integrally with opposite upright walls of said case and an integral hinge located adjacent the junction of the inner end of each strap and the associated wall of the case and supporting said strap for upward swinging to a position in which said strap may serve as a handle for facilitating carrying

of the battery, each strap including a first retainer and a second retainer being molded integrally with the associated wall of said case, each hinge also permitting its associated strap to



swing downwardly to a storage position alongside said case, and said retainers being sized to interfit with one another to releasably hold said straps in said storage position.

4,042,763

PHOTODEGRADABLE RESIN COMPOSITIONS

Bert Howard Clampitt, Katy, and Richard Harry Haveas, Hockley, both of Tex., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Oct. 8, 1976, Ser. No. 730,901
Int. Cl.[2] C08J *3/20*
U.S. Cl. 526—4 **4 Claims**

1. A photodegradable resin composition consisting essentially of an intimate, physical admixture of:

a. At least 90 weight % of a film forming ethylene polymer,

b. From about 1 to about 10 weight % of a polyethylene-like polymer containing about 0.8 to about 75 trans carbon-to-carbon double bonds per 1,000 carbon atoms, and

c. A minor amount of cobalt salt whose cobalt metal content is equivalent to about 1 – 3000 ppm of the total composition;

said polyethylene-like polymer having been prepared by subjecting an ethylene-vinyl acetate copolymer containing about 0.5 to 35 percent by weight of vinyl acetate comonomer to a temperature from about 275° C to about 400° C in an inert atmosphere for a time period varying with temperature from about 1 hour to about 8 hours at 275° C to from about 0.5 to about 10 minutes at 400° C, thereby cracking said ethylene-vinyl acetate copolymer to acetic acid and forming trans carbon-to-carbon double bonds in the polymer chain.

4,042,764

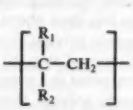
PHOTODEGRADABLE POLYMERIC COMPOSITIONS HAVING HIGH THERMAL STABILITY CONTAINING A HALOGENATED QUINONE AND A TRANSITION METAL COMPOUND

Francesco Gratani, Sesto S. Giovanni (Milan), and Marco Binaghi, Milan, both of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed June 24, 1975, Ser. No. 589,891
Claims priority, application Italy, July 3, 1974, 24765/74
Int. Cl.[2] C08J *3/20*
U.S. Cl. 526—4 **10 Claims**

1. A photodegradable and thermostable polymeric composition consisting essentially of

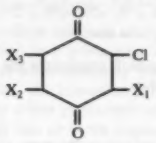
a. a polymer consisting of monomeric units of the formula



wherein R_1 and R_2 are independently selected from the group consisting of hydrogen, C_1–C_3 alkyl, C_6–C_{12} aryl, C_6–C_{12} cycloalkyl and chlorine;

b. 0.001 to 5% by weight, based on the weight of the polymer of at least one compound of a transition metal having an atomic number between 21 and 30, 40 and 47 and 57 and 79, inclusive and which is soluble in said polymer and endowed with photodegrading properites with respect to the polymer; and

0.05 to 5% by weight, based on the weight of the polymer of at least one quinonic compound of the formula.



wherein: X_1, X_2 and X_3 are independently selected from the group consisting of hydrogen, Cl, a C_1–C_{18} alkyl group, or a C_1–C_{21} thioalkyl, alkoxy, aryloxy, alkylcarboxy, arylcarboxy and arylsulfonoxy group.

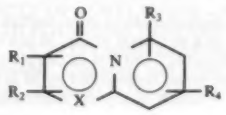
4,042,765

PHOTODEGRADABLE PLASTIC COMPOSITIONS CONTAINING NITROGEN HETEROCYCLIC COMPOUNDS

Joseph C. Floyd, Baytown, Tex., and Don A. Plank, Sarnia, Canada, assignors to Exxon Research and Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 562,577, March 27, 1975, abandoned. This application Oct. 28, 1976, Ser. No. 736,653
Int. Cl.[2] C08J *3/20*
U.S. Cl. 526—6 **16 Claims**

1. A plastic composition containing polyolefin having incorporated therein an effective amount of a photodegradation accelerating agent which is a substituted nitrogen heterocyclic compound having the formula:



wherein X is nitrogen or CH, and R_1, R_2, R_3 and R_4 are selected from the group consisting of hydrogen; a straight or branched chain alkyl group having from 1 to 6 carbon atoms; cyano, nitro; lower alkoxy; fluorine, dialkylamino; phenyl; halo-phenyl; benzyl; or halo-benzyl.

4,042,766

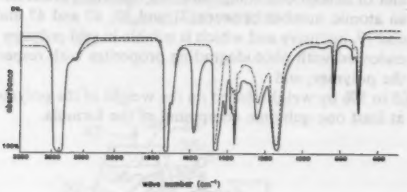
METHOD FOR PREPARATION OF IONICALLY CROSSLINKED ETHYLENE COPOLYMERS

Yoshiharu Tatsukami; Mitsuyuki Okada, and Tsutomu Takahashi, all of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Mar. 18, 1976, Ser. No. 668,242
Claims priority, application Japan, Mar. 18, 1975, 50-33206
Int. Cl.[2] C08F *8/42, 8/00*
U.S. Cl. 526—47 **2 Claims**

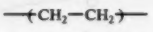
1. A method for preparation of ionically crosslinked ethylene copolymers, which comprises melt blending a copolymer comprising as the essential monomer unit components (a) ethylene and (b) at least one α,β-ethylenically unsaturated carboxylic acid ester selected from the group consisting of isoproyl acrylate, isopropyl methacrylate, tert-butyl acrylate and tert-butyl methacrylate with (c) at least one metal compound selected from the group consisting of the acetates, formates and oxides of zinc, magnesium, calcium and sodium,

and maintaining the resulting molten blend at a temperature of about 200° to 320° C to give in one step an ionically crosslinked



ethylene copolymer which comprises the monomer unit components of the formulae:

[W]



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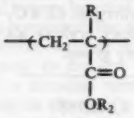

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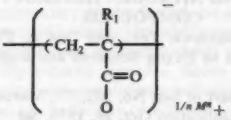
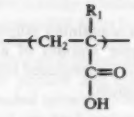


[Z]



wherein R_1 is a hydrogen atom or a methyl group, R_2 is an isopropyl group or a tert-butyl group, M is a metal atom from said metal compound (c), and n is an integer corresponding to the valence of the metal represented by M in a molar proportion of $w : x : y : z$ which satisfy the relationships of the equations:

$$\frac{x+y+z}{w+x+y+z} \times 100 = 3 \text{ to } 10$$

$$\frac{y}{x+y+z} \times 100 = 10 \text{ to } 70$$

wherein either one of x and z can be zero.

4,042,767

PROCESS FOR POLYMERIZATION OF ETHYLENE

Wolfgang Payer; Volker Riepe, and Wilhelm Zoller, all of Oberhausen, Germany, assignors to Ruhrchemie Aktiengesellschaft, Oberhausen, Germany

Filed Feb. 9, 1976, Ser. No. 656,133
Claims priority, application Germany, Feb. 26, 1975, 2508284
Int. Cl.² C08F *10/02, 10/00*
U.S. Cl. 526—64 **3 Claims**

1. In a process for the polymerization of ethylene in a tube form reactor having side branches opening into the reactor, the side branches having a diameter of not more than about 12 mm, and wherein polymerization is carried out at a pressure between about 500 and 5,000 bar and a temperature between about 100° and 350° C, the improvement comprising maintaining the flow number at a value not less than about 0.20 m^2/sec, said flow number being defined as the product of reactor internal diameter and the rate of flow of the reaction through the reactor.

4,042,768

CONTINUOUS SOLVENT-FREE POLYMERIZATION OF VINYL DERIVATIVES

Ernst-Willi Müller, Leverkusen, and Manfred Wicke, Cologne, both of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Aug. 11, 1975, Ser. No. 603,367
Claims priority, application Germany, Aug. 16, 1974, 2439341
Int. Cl.² C08F *2/02, 6/26, 220/42, 220/14*
U.S. Cl. 526—65 **4 Claims**

1. A process for the polymerization of at least one aromatic vinyl monomer which comprises the steps of:

1. in a first stage, continuously introducing monomer feed under elevated pressure into a first reaction zone which is flooded and is always kept completely filled with liquid phase mixture of monomer and polymer thereof and polymerizing said monomer to a degree of conversion, based on total monomer feed, of from 5 to 40% by weight at a temperature of from 80° to 170° C.;
2. in a second stage, conducting the reaction mixture from the first stage at the same pressure into a second reaction zone which is also completely filled with said liquid phase mixture and operated under conditions of over-pumping and which is adapted to conduct highly viscous melts therethrough, the mixture flowing through the second reaction zone at a rate which if from 1.1 to 5 times the intrinsic rate, and polymerizing the mixture in the second reaction zone to a degree of conversion, based on total monomer feed, of from 40 to 95% by weight at a temperature of from 120° to 250 ° C., the pressure in the first and second stages being selected so that the monomer feed is liquid, and continuously removing polymer from the second reaction zone by passing it to a zone of reduced pressure and
3. in a third stage, removing unreacted monomer from the removed polymer by evaporation.

4,042,769

CATALYSTS FOR THE POLYMERIZATION OF ETHYLENE

Thomas J. Lynch, Orange, Tex., assignor to Gulf Research & Development Company, Pittsburgh, Pa.

Filed Mar. 12, 1975, Ser. No. 557,498
Int. Cl.² C08F *110/02*
U.S. Cl. 526—106 **4 Claims**

1. In a Particle Form Process for the manufacture of an ethylene polymer in which ethylene is contacted with a chromium catalyst supported on silica; the improvement which consists essentially of employing as the polymerization initiator an olefin polymerization catalyst consisting essentially of a chromium polyerization catalyst supported on a silica aerogel having a surface area of at least about 300 square meters per gram and a pore volume of at least about 2 milliliters per gram, said values being determined by isothermal liquid nitrogen desorption analysis; said silica aerogel having been prepared by a modified Kistler process consisting essentially of the steps of:

a. preparing a silica hydrogel,
b. treating the silica hydrogel with an oranic solvent that will dissolve at least least 10 weight % water to free the silia hydrogel of water, at least the final contact being with a rigorously anhydrous organic solvent so that the organic solvent, after reaching equilibrium with the silica hydrogel, contains less than about 200 ppm of water,
c. removing the organic solvent from the organic solvent-silica hydrogel mixture of step (b) by heating the mixture to above the critical point in a pressure-resistant vessel and releasing the organic solvent therefrom at a pressure at least equal to the critical pressure of the organic solvent,
d. cooling the silica aerogel from step (c) to ambient temper-

ature and pressure under rigorously ahydrous conditions, and

e. calcining the silica aerogel from step (d) at an elevated temperature in a rigorously anhydrous environment;

said ethylene polymerization catalyst having been prepared by contacting said chromium polymerization catalyst with said silica aerogel under rigorously anhydrous conditions.

4,042,770

MANUFACTURE OF OLEFIN POLYMERS

Robert Bachl, Worms; Hans Frielingsdorf, Bad Duerkheim; Wolfgang Gruber, Frankenthal; Heinz Mueller-Tamm, and Leonhard Gonsior, both of Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Nov. 13, 1975, Ser. No. 631,642

Claims priority, application Germany, Nov. 23, 1974, 2455535

Int. Cl.[2] C08F *4/02, 4/24, 10/00*

U.S. Cl. 526—106 **1 Claim**

1. A process for the manufacture of olefin polymers by polymerization of C_{2-8} α-monoolefins at temperatures of from 60° to 160° C and olefin pressures of from 0.5 to 40 bars by means of a silicic xerogel/chromium trioxide catalyst obtained by (1) synthesizing a particulate silicic xerogel having a particle diameter of from 10 to 2000 μm, (2) doping said xerogel with from 0.1 to 10 percent by weight (based on the xerogel and calculated as chromium) of chromium trioxide or a chromium compound capable of conversion to chromium trioxide under the conditions of stage (3) and (3) finally maintaining the resulting product at a temperature of from 400° to 1100° C for 10 to 1000 minutes in a water-free stream of gas containing oxygen in a concentration of more than 10% v/v, wherein the silicic xerogel/chromium trioxide catalyst used is one which has been obtained by

1. synthesizing the silicic xerogel in the first stage by

1.1. taking an aqueous solution of a sodium silicate (water glass) which contains from 0.1 to 20% by weight of solids (calculated as silicon dioxide, SiO_2),

1.2. exchanging the sodium ions contained in said solution for hydrogen ions by means of an ion exchanger so that the sodium content (calculated as sodium oxide, Na_2O) in the silicic xerogel is not more than 0.2%,

1.3. introducing a water-soluble aluminum salt and, if necessary, water into the resulting aqueous silicic acid solution such that the ratio of water to silicic acid (calculated as silicon dioxide, SiO_2), by weight, is from 100:0.05 to 100:24 and the ratio of silicic acid (calculated as silicon dioxide) to aluminum salt (calculated as aluminum oxide, Al_2O_3), by weight, is from 100:100 to 100:2,

1.4. adjusting, if necessary, the pH of the solution obtained in stage (1.3) to from 0.1 to 3.5 by means of a water-soluble inorganic acid such that the ratios of water to silicic acid and silicic acid to aluminum salt, by weight, remain in the ranges given under (1.3),

1.5. adjusting the pH of the solution obtained in (1.3) or (1.4) to from 4 to 12 by means of a water-soluble nitrogen-base compound having a neutralizing action,

1.6. extracting the resulting product in the solid phase obtained under (1.5) (silicic hydrogel) by means of an organic liquid selected from the series of C_{1-4} alkanols and/or C_{3-5} alkanones until the organic liquid absorbs no more water, and, finally,

1.7. drying the dehydrated gel obtained in (1.6) and saturated with organic liquid for a period until no further loss of weight occurs at 120° C (xerogel formation).

4,042,771

POLYMERIZATION OF OLEFINS WITH PRE-ACTIVATED CATALYSTS

Michel Avaro, and Pierre Mangin, both of Martigues, France, assignors to Naphtachimie, Paris, France

Continuation of Ser. No. 398,161, Sept. 17, 1973, abandoned. This application Sept. 18, 1975, Ser. No. 614,501

Int. Cl.[2] C08F *210/00, 212/00*

U.S. Cl. 526—124 **18 Claims**

1. In a method for polymerizing olefins at low pressures, the improvement comprising contacting the olefin with a catalyst comprising (1) a solid compound of a trivalent titanium compound, with the trivalent titanium compound being subjected before polymerization to a pre-activation treatment by being brought into contact simultaneously with magnesium and one or more alkyl halides, the transition metal compound remaining in the solid state when contacted with the magnesium and alkyl halides and (2) one or more organo-metallic compounds of Groups II and III of the Periodic Table of elements.

17. In a method for the polymerization of olefins at low pressures, the improvement comprising contacting the olefin with a catalyst comprising (1) a solid compound of trivalent titanium having the formula

$$Ti(OR)_mX_{3-m}$$

where R is C_2 to C_8 alkyl, X is halogen and m ranges from 0 to 3, said compound having been pretreated for 30 minutes to 3 hours by contacting the compound simultaneously with a halogenated hydrocarbon of the formula $C_yH_{2y+1}X$ where y is an integer from 1 to 12 and X is halogen and finely divided magnesium metal, the titanium compound remaining in the solid state when contacted with the magnesium and halogenated hydrocarbon, and (2) an organoaluminum compound of the formula

$$Al\,R'_nX_{3-n}$$

where R′ is C_2 to C_8 alkyl, X is halogen and n ranges from 1 to 3.

4,042,772

UREA AS AN ADDITIVE TO IMPROVE THE VISCOSITY AND ACTIVITY OF ACRYLAMIDE—ACRYLAMIDE ACRYLIC ACID POLYMERS PREPARED FROM POOR QUALITY ACRYLAMIDE

Edward G. Ballweber, Glenwood, and Wood E. Hunter, Lombard, both of Ill., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Nov. 8, 1976, Ser. No. 739,770

Int. Cl.[2] C08F *2/00, 4/00, 20/70, 120/54*

U.S. Cl. 526—220 **3 Claims**

1. A method for making good quality acrylamide and acrylamide acrylic acid polymers which contain at least 50% by weight of acrylamide from contaminated acrylamide which comprises polymerizing acrylamide to form a water-soluble acrylamide polymer in the presence of at least 20% by weight based on acrylamide of urea.

4,042,773

PEROXIDE FREE RADICAL INITIATORS CONTAINING ULTRAVIOLET LIGHT STABILIZING GROUPS

Chester S. Sheppard, and Ronald E. MacLeay, both of Buffalo, N.Y., assignors to Pennwalt Corporation, Philadelphia, Pa.

Division of Ser. No. 435,622, Jan. 22, 1974, abandoned, which is a continuation of Ser. No. 98,893, Dec. 16, 1970, abandoned. This application Apr. 27, 1976, Ser. No. 680,546

Int. Cl.[2] C08F *4/36, 4/34, 12/08*

U.S. Cl. 526—208 **7 Claims**

1. In the process of preparing a polymer containing an ultraviolet light stabilizer chemically bound to said polymer comprising polymerizing an ethylenically unsaturated monomer capable of being polymerized by free radicals in the presence of a free radical initiator the improvement comprising polymerizing said monomer in the presence of a free radical initia-

tor containing ultraviolet light stabilizing groups and having the formula:

$(R\text{-}O\text{-}O)_nR'$

wherein

n is 1 to 4 with provisos (a) through (f) recited below,

a. when *n* is 1, R and R′ are the same or different and are selected from the group consisting of hydrogen, acyl of 2–20 carbons, aroyl of 7–20 carbons, tert-alkyl of 4–12 carbons, tert-cycloalkyl of 4–12 carbons, tertaralkyl of 9–15 carbons, alkoxycarbonyl of 2–20 carbons, cycloalkoxylcarbonyl of 4–20 carbons, carbamoyl, phenylcarbamoyl, alkylcarbamoyl of 2–13 carbons, cycloalkylcarbamoyl of 4–13 carbons, α-hydroxyalkyl of 2–10 carbons, α-hydroxycycloalkyl of 3–10 carbons, α-hydroperoxyalkyl of 2–10 carbons, α-hydroperoxycycloalkyl of 3–10 carbons, alkylsulfonyl of 4–10 carbons, cycloalkylsulfonyl of 3–12 carbons, tert-(alkyloxyalkyl) of 4–20 carbons, tert-(alkoxycycloalkyl) of 4–20 carbons, Q_3M, Q_2M', diethylphosphate, dimethylphosphate, diphenylphosphinic, di-n-octylphosphate, and dibutyl phosphinic;

wherein

M is selected from silicon, germanium, or tin;

M′ is boron; and

Q is alkyl of 1–11 carbons, phenyl, benzyl, or cyclohexyl;

b. when *n* is 2, R is selected from any of the radicals listed under (a) and R′ is selected from the group consisting of carbonyl, alkylidene, of 2–20 carbons, cycloalkylidene of 3–2 carbons, di-tert-alkylene of 6–20 carbons, di-tert-cycloalkylene of 6–20 carbons, di-tert-aralkylene of 12–20 carbons, $Q_2M<$, $QM'<$

wherein

M is selected from silicon, germanium or tin;

M′ is boron; and

Q is alkyl of 1–11 carbons, phenyl, benzyl, or cyclohexyl;

c. when *n* is 3, R is selected from any of the radicals listed under (a) and R′ is selected from the group consisting of tert-aralkyl-di-tert-aralkylene of 15–20 carbons, tert-alkylalkylidene of 4–20 carbons, tert-cycloalkylalkylidene of 4–20 carbons, tert-alkylcycloalkylidene of 4–20 carbons, tert-cycloalkylcycloalkylidene of 6–20 carbons, tert-alkyl-di-tert-alkylene of 10–19 carbons, tert-alkyl-di-tert-cycloalkylene of 10–19 carbons, tert-cycloalkyl-di-tert-alkylene of 10–19 carbons, tert-cycloalkyl-di-tert-cycloalkylene of 10–19 carbons, and QM=wherein

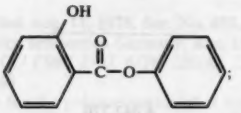
M is selected from silicon, germanium or tin; and

Q is selected from alkyl of 1–11 carbons, phenyl, benzyl or cyclohexyl;

d. when *n* is 4, R is selected from any of the radicals listed under (a) and R′ is dialkylidene of 5–16 carbons;

e. only one of R and R′ can be hydrogen; and

f. at least one of R and R′ contains an ultraviolet light stabilizing radical of a compound selected from the group consisting of



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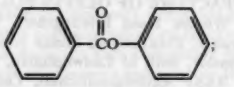

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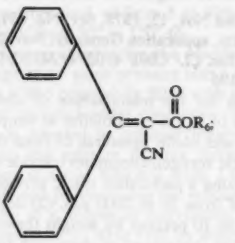

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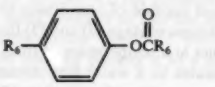
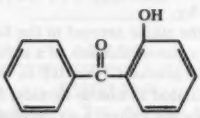


and



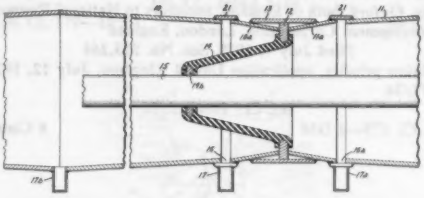
wherein R_6 is alkyl of 1–6 carbon atoms.

4,042,774

PARTICLE TRAPPING SHEATH COUPLING FOR ENCLOSED ELECTRIC BUS APPARATUS

Roy Nakata, Pittsfield, Mass., and William Joseph Johenning, Wallingford, Pa., assignors to General Electric Company, Philadelphia, Pa.

Filed Apr. 8, 1976, Ser. No. 675,009
Int. Cl.[2] H01B 9/04
U.S. Cl. 174—14 R 6 Claims



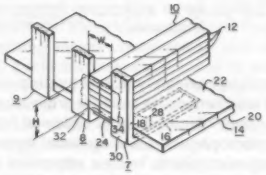
1. High voltage electric bus apparatus adapted for disposition with its longitudinal axis substantially horizontal and including a high voltage conductor disposed in coaxial radially spaced relation within a sectionalized tubular metallic enclosing sheath comprises, a pair of tubular sheath members disposed in axially spaced apart end-to-end relation, a coupling band enveloping axially juxtaposed ends to said sheath members and having an axial width greater than the space between said ends, said band being split axially along said sheath and peripherally juxtaposed ends of said band defining an elongate transverse particle trapping aperture in a bottom wall of said sheath between said coupled sheath members, and a particle trapping receptacle fixedly mounted over said aperture externally of said sheath.

4,042,775

ELECTRICAL CONNECTIONS OF CONDUCTORS TO A BUS BAR

Kou Chi Lin, Sharon, and LeRoy E. Dobson, Jamestown, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 28, 1975, Ser. No. 636,282
Int. Cl.[2] H01R 5/04; H01F 15/10
U.S. Cl. 174—94 R 10 Claims



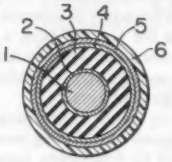
1. An electrical conductor connection, comprising:
a plurality of conductors assembled with their ends aligned to form a substantially rectangularly shaped composite end portion having dimensions W and H,
first and second connector conductors each having a plurality of flat surfaces,
a bus bar having first and second major opposed sides and connecting edge portions,
means connecting first portions of each of said first and second connector conductors to a common side of said bus bar, with second portions of each of said first and second connector conductors extending outwardly from the opposing side of said bus bar, said second portions being spaced by the dimension W,
said assembled conductors being disposed only between the second portions of said first and second connector conductors, with like orientations of their W dimensions and with the surface of the composite end portion substantially aligned with selected flat surfaces of the first and second connector conductors,
and a fusion of metal across the surface of the composite end portion of the assembled conductors and at least a portion of each of the flat surfaces of the first and second connector conductors aligned therewith.

4,042,776

WATER TREE FREE POWER CABLE

Hironori Matsuba, Kawasaki, and Kazumi Satou, Ichihara, both of Japan, assignors to The Furukawa Electric Company, Ltd., Tokyo, Japan

Filed Aug. 21, 1975, Ser. No. 606,601
Int. Cl.[2] H01B 3/30
U.S. Cl. 174—110 R 11 Claims



1. A water tree free electric power cable comprising a conductor enclosed in a sheath of insulation selected from the group consisting of a polyethylene compound, cross-linked polyethylene compound, ethylenepropylene rubber compound and butyl rubber compound, said insulation containing a substantially homogeneously dispersed water soluble strong electrolyte capable of increasing the conductivity of the water in an amount of 10^{-7} to 1 percent by weight.

4,042,777

ONE-HANDED KEYBOARD AND ITS CONTROL MEANS

Frank Charles Bequaert, Lexington, and Nathaniel Rochester, Duxbury, both of Mass., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 619,867, Oct. 6, 1975, abandoned. This application Nov. 15, 1976, Ser. No. 741,638
Int. Cl.[2] H04L 15/04, 17/02; B41J 7/54
U.S. Cl. 179—79 31 Claims

7. A keyboard for one-handed typing of chords, such chords being formed by the simultaneous pressing of one or more keys on the keyboard to produce one or more characters, the keyboard comprising
a row of keys for being operated by the thumb, electrical switch means being connected to the keys in the row of keys, a row of thumb positions located on the row of keys,

a thumb position being located on a single key or on the boundary across adjacent keys in the row of keys pressable by the thumb,

a particular switch combination of closed and open switching paths in the electrical switch means being provided for each chord pressable on the row of keys,

means for interpreting chords, comprising first means to generate coded signals representing members of a set of characters, switching and logical circuit means to sense the particular switch combinations of closed and open switching paths for a chord to select one set from among several sets of coded representations of characters, the selected set corresponding to the thumb position,

an array of keys for being operated by the fingers of the same hand having the thumb for operating the row of keys, the electrical switch means also being connected to the keys in the array of keys, an array of finger positions located on the array of keys, a finger position being located on each key and across the boundary of adjacent keys pressable by any one finger on the array of keys, a particular switch combination of closed and open switching paths in the electrical switch means being provided for each chord pressable on the array of keys,

means for interpreting chords, comprising second means to generate coded signals representing members of the set of characters selected by first means, switching and logical circuit means to sense the particular switch combinations of closed and open switching paths of a chord to select the coded representations of the characters that correspond to the finger positions that correspond to the respective chord, and output circuit means to issue the coded representations of characters.

4,042,778

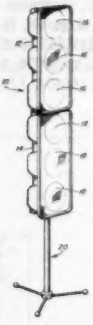
COLLAPSIBLE SPEAKER ASSEMBLY

Henry H. Clinton, R.F.D. No. 1, Ivoryton, Conn. 06442

Filed Apr. 1, 1976, Ser. No. 672,730

Int. Cl.² H04R *1/02, 1/40*

U.S. Cl. 179—1 E **13 Claims**



1. A collapsible speaker assembly comprising:

a split case formed by two mating shells pivotally connected to one another at one side for folding between open and closed positions, the shells at their interface being similar in shape to mate in the closed position and elongated in a longitudinal direction, each shell also defining a plurality of sound compartments arranged serially in the longitudinal direction, each compartment having a forward opening at the interface of the shells and being closed at the rear;

a plurality of speakers mounted to the split case at the forward openings of the serially arranged sound compartments, the speakers being positioned relative to the interface of the shells to permit the pivotal shells to be brought together in mating relationship and thereby close the split case; and

releasable means for holding the split case closed when the pivotal shells are brought together in mating relationship.

4,042,779

COINCIDENT MICROPHONE SIMULATION COVERING THREE DIMENSIONAL SPACE AND YIELDING VARIOUS DIRECTIONAL OUTPUTS

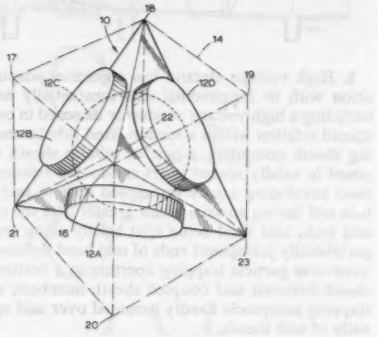
Peter Graham Craven, Headington, and Michael Anthony Gerzon, Oxford, both of England, assignors to National Research Development Corporation, London, England

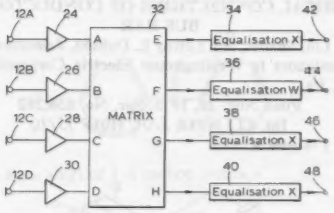
Filed July 7, 1975, Ser. No. 593,244

Claims priority, application United Kingdom, July 12, 1974, 30977/74

Int. Cl.² H04R *1/20*

U.S. Cl. 179—1 DM **8 Claims**





1. A microphone assembly for providing outputs corresponding to at least zero order and first order harmonics equivalent to the outputs which would be obtained from a plurality of coincident microphones, the directional response curve of each coincident microphone being a respective spherical harmonic, said microphone assembly comprising at least four microphone units mutually disposed at the integration points of an integration rule for the surface of a sphere, as hereinbefore defined, matrix means having a respective combining means for each desired spherical harmonic including a first combining means for said zero order harmonics and a second combining means for said first order harmonics, means for applying the output of each microphone unit to said combining means with a gain proportional to the weight of said integration rule corresponding to the integration point at which said microphone unit is located and a further gain equal to the magnitude of said spherical harmonic in the direction of maximum response of said microphone unit, first equalisation means connected to said first combining means for applying an equalisation to the output thereof and a second equalisation means connected to said second combining means for applying an equalisation to the output thereof, the equalisation being such that all outputs of each said equalisation means have substantially the same

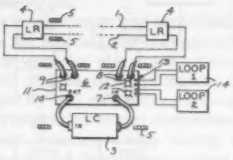
frequency response to sounds from all directions up to a limiting frequency and are substantially identical to the outputs obtained from a plurality of coincident microphones.

4,042,780

MULTIPLE MESSAGE FRAME ADAPTOR APPARATUS FOR LOOP COMMUNICATION SYSTEM

Frederick J. Wolters, Whitefish Bay, Wis., assignor to Johnson Controls, Inc., Milwaukee, Wis.

Filed July 23, 1975, Ser. No. 598,377
Int. Cl.[2] H04J *3/14*
U.S. Cl. 179—15 AL 30 Claims



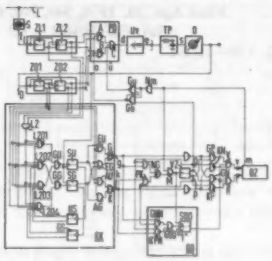
1. In a loop communication system having a controller station having a controller output means adapted to generate time spaced multiple bit message frames and having a controller input means adapted to receive said message frames, a plurality of remote stations, a first transmission trunk line for connecting said controller means and said remote stations in a series conducting loop including a first remote station and a second remote station, a second tramsission trunk line for producing a parallel conducting branch in said loop, a message converting adaptor apparatus for connecting the first and second transmission line in said loop comprising a first converting means having a single message frame input and a pair of signal transmitting means each one connected to one of a pair of message frame outputs, a signal logic means connected to said input and said outputs and transmitting said message frame from said frame input to both of said transmitting means and thereby producing the same message frame on said outputs as the message frame received at said frame input, means for connecting of the first trunk line to said frame message inputs and to one of said pair of message frame outputs, means for connecting of the second trunk line to the second of said pair of message frame outputs and thereby providing duplicate transmission of said message frames from said one message frame input, a second converting means having a pair of message frame inputs and a single message frame output, a message frame transmitting means connected to said single message frame output, a selector means connected to said pair of message frame inputs and directly transmitting each bit of the message frame from one of said inputs, means for connecting the first trunk line to one of said pair of message frame inputs and to said single message frame output and connecting the second trunk line to the second of said message frame inputs, and one of said stations including means for connecting the first trunk line to a first of said pair of outputs of said first converting means to a first of said pair of inputs of said second converting means and connecting the second of said pair of outputs of said first converting means to the second of said pair of inputs of said second converting means and thereby provide a simultaneous flow of said message frame in the same direction relative to said controller means and said remote stations, and wherein said signal logic means of said first converting section includes a receiver connected to said inputs, a pair of transmitters connected to said outputs, said transmitters having signal input means for receiving the bit signals and a strobe means for activating the transmitters, a bit transmitting means connected between said receivers and both of said transmitters, a disable timing means connected to said receiver and operable to disable and receiver, and a delay timing means connected to said receiver and activated thereby, and establishing an output after a predetermined period, said delay timing means being connected to said strobe means and to said disable timing means for simultaneous operation thereof.

4,042,781

APPARATUS FOR SYNCHRONIZING OSCILLATORS IN THE NETWORK NODES OF A DIGITAL TELECOMMUNICATIONS NETWORK

Alexander Dragotinov, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed July 23, 1976, Ser. No. 708,009
Claims priority, application Germany, July 25, 1975, 2533463
Int. Cl.[2] H04J *3/06*
U.S. Cl. 179—15 BS 7 Claims



1. A circuit for mutually snychronizing a plurality of exchange pulse train oscillators in a PCM t.d.m. digital telecommunications network wherein one of said exchange pulse train oscillators is arranged in each of the network nodes of said telecommunications network, said circuit comprising in each network node:

a first frequency reducer connected to the incoming digital telecommunication lines for generating a first pulse sequence according to a given frequency reduction factor; said first pulse sequence corresponding to the line pulse train of said incoming digital telecommunication lines;

a second frequency reducer connected to the output of said exchange pulse train oscillator for generating a second pulse sequence according to said given frequency reduction factor, said second pulse sequence corresponding to the exchange pulse train generated by said exchange pulse train oscillator;

a phase discriminator connected to receive said first pulse sequence from said first frequency reducer and said second pulse sequence from said second frequency reducer, said phase discriminator comprising logic-linking circuits, whereby said phase discriminator generates a phase difference signal in response to the phase difference between said first pulse sequence and said second pulse sequence;

means connected to said phase discriminator for generating a frequency regulating signal in response to the phase difference signal generated by said phase discriminator, whereby said frequency regulating signal is used to frequency regulate said exchange pulse train oscillator contained in said network node;

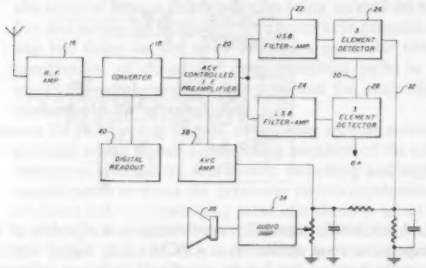
means connected to said first and second frequency reducers for comparing said first and second pulse sequences and digitally counting each overshooting and each undershooting of a $-n2\pi$ ($n = 0, 1, 2, 3, \ldots N$) stage of the phase difference between said first pulse sequence and said second pulse sequence, said counting means having a counting volume N, said comparing and counting means providing said phase discriminator with a first special control input signal for maintaining said phase discriminator in a starting state corresponding to a phase difference of $+2\pi$ and a second special control input signal for maintaining said phase discriminator in a starting state corresponding to a phase difference of -2π, said first special control signal being generated by said counting

means when the count of the overshooting of $+n2\pi$ stages of the phase difference exceeds the count of the undershooting of $+n2\pi$ stages, said second special control signal being generated by said counting means when the count of the undershooting of $-n2\pi$ stages of the phase difference exceeds the count of the overshooting of $-n2\pi$ stages, whereby the output phase difference signal of said phase discriminator enables said means for generating a regulating signal to generate a regulating signal within a constant zone on both sides of a linear range.

4,042,782
HIGH SELECTIVITY RADIO RECEIVER

Joseph A. Worcester, R.D. 1, Frankfort, N.Y. 13340

Filed Apr. 28, 1976, Ser. No. 681,161
Int. Cl.[2] H04H 5/00
U.S. Cl. 179—15 BT **21 Claims**



1. A superheterodyne radio receiver for reception of signals having upper and lower sidebands containing audio program materials, said receiver comprising:

a. means for translating a desired signal to a fixed intermediate frequency;

b. first and second selective filters each connected to receive input signals from said translating means, said filters providing equal attenuation of input signals at said fixed frequency and unequal attenuation of input signals at other than said fixed frequency; and

c. demodulation means providing audio output signals in response to inputs from said filters, said output signals being attenuated by the greater of the attenuations of said input signals by said filters.

4,042,783
METHOD AND APPARATUS FOR BYTE AND FRAME SYNCHRONIZATION ON A LOOP SYSTEM COUPLING A CPU CHANNEL TO BULK STORAGE DEVICES

Abraham M. Gindi, San Jose, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 11, 1976, Ser. No. 713,453
Int. Cl.[2] H04J 3/08; H04L 7/08
U.S. Cl. 179—15 AL **7 Claims**

1. A method for resynchronizing a primary terminal and a plurality of secondary terminals in a loop communication system, each terminal being adapted to receive and transmit frame delimited bit stream messages from and to the loop, each terminal being further adapted to detect synchronization and synchronization anomalies, the method comprising the steps of:

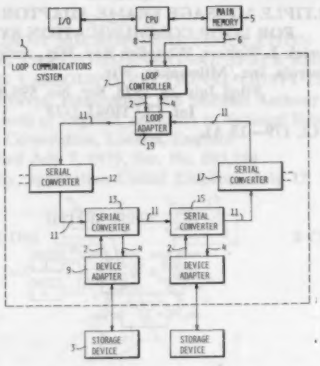
detecting at any terminal the existence of a synch anomaly and immediately inhibiting all bit stream message transmission;

transmitting on the loop a first unique pattern by the terminal detecting the anomaly;

resynchronizing to the first unique pattern as a reference by each terminal downstream to the terminal detecting the anomaly and including the primary terminal;

transmitting on the loop a second unique pattern by the primary terminal responsive either to the first pattern or a synch anomaly;

resynchronizing of all terminals upstream from the terminal detecting the synch anomaly to the second pattern as a reference; and

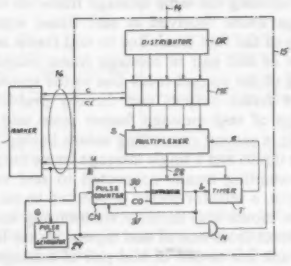


resuming reception and transmission of bit stream messages upon the extinction of the synch anomaly as when the terminal detecting the anomaly has resynched to the second pattern.

4,042,784
DIGIT STORER FOR TELECOMMUNICATION SYSTEM

Carlo Lupattelli, and Alfredo Miotti, both of Milan, Italy, assignors to Societa Italiana Telecomunicazioni SIEMENS, S.p.A., Milan, Italy

Filed Oct. 29, 1975, Ser. No. 626,876
Claims priority, application Italy, Oct. 29, 1974, 28899/74
Int. Cl.[2] H04Q 1/30
U.S. Cl. 179—18 EB **4 Claims**



1. In a telecommunication system including a multiplicity of lines adapted to initiate outgoing calls to destinations identified by multidigit call numbers, said destinations being reachable through remote junctions served by a multiplicity of transmission paths and identified by a characteristic initial portion of a call number, switch means for temporarily connecting one of said transmission paths to a calling line, and a marker responsive to said characteristic portion for controlling said switch means,

the combination therewith of storage means for the digits of a call number, said storage means comprising:

a register with a plurality of stages accommodating at least some of the digits in a call number.

distributing means for loading the digits of a call number, received from one of said lines, into respective stages of said register;

circuitry for the transfer of said characteristic portion of said

call number from said register to said marker, with retention of the remaining digits in said register;

a generator of a train of readout pulses activatable by said marker upon reception of said characteristic portion and establishment of a connection between said one of said lines and a selected transmission path, said generator having an output lead extending to the connection so established for transmitting said readout pulses thereover;

counting means connected to said generator for receiving said readout pulses therefrom and registering a count thereof;

comparison means with a first input connected to said counting means and with a second input connectible to the stages of said register containing said remaining digits;

multiplexing means for sequentially connecting said second input to said stages;

gating means in said output lead controlled by said comparison means for blocking the transmission of said readout pulses in the presence of a match between said count and the contents of a stage of said register connected to said second input by said multiplexing means; and

timing means responsive to said comparison means for deactivating said counting means during a predetermined interdigit pause and thereupon actuating said multiplexing means for connecting another stage of said register to said second input with concurrent unblocking of said output lead for transmission of the next digit over said connection.

4,042,785

MARKER FOR TELECOMMUNICATION SYSTEM

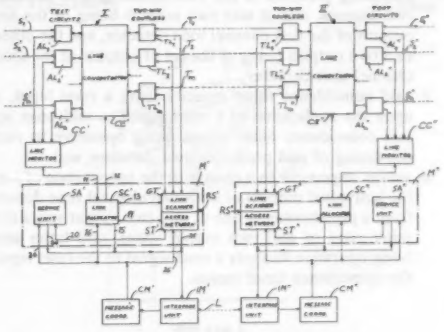
Gualtiero Rigo, Settimo Milanese (Milan), and Carlo Alberto Manghi, Rosate (Milan), both of Italy, assignors to Societa Italiana Telecommunicazioni SIEMENS S.p.A., Milan, Italy

Filed Feb. 11, 1976, Ser. No. 657,389

Claims priority, application Italy, Feb. 12, 1975, 20179/75

Int. Cl.[2] H04Q *3/42*

U.S. Cl. 179—18 FC **5 Claims**



1. In a telecommunication system with at least two terminals interconnected by a plurality of links, each terminal serving a number of local lines larger than said plurality and being provided with a line concentrator for selectively connecting any local line to any link under the control of a marker communicating via a signal path with a marker of the other terminal, the improvement wherein each marker comprises:

a link allocator responsive to signals from said local lines and from said signal path for controlling said line concentrator for engaging a link to be connected to a local line; and

a signalization unit communicating with said link allocator and with said signal path for exchanging signals in a time-division mode with all links engaged by said line concentrator;

said link allocator and said signalization unit including each a read-only memory and an ancillary memory, said read-only memory being jointly controlled by received instructions and data stored in said ancillary memory for reading out information and updating the contents of said ancillary memory.

4,042,786

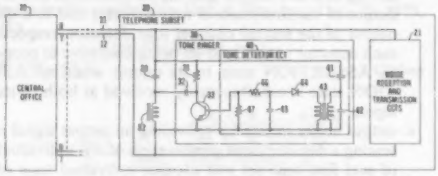
TELEPHONE RINGER CIRCUIT

Laimons Freimanis, Chicago, Ill., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 26, 1976, Ser. No. 680,363

Int. Cl.[2] H04M *1/26*

U.S. Cl. 179—84 R **4 Claims**



1. A telephone set ringing circuit responsive to conventional high voltage low frequency ringing signals and low voltage high frequency tone alerting signals on a two-wire telephone line comprising:

an electromechanical ringer connected across said two-wire telephone line responsive to conventional high voltage low frequency ringing signals;

energy storage menas connected to said telephone line for storing electrical energy present on said two-wire telephone line; and

tone detector means connected across said two-wire telephone line for connecting said energy storage means to said electromechanical ringer responsive to low voltage high frequency tone alerting signals.

4,042,787

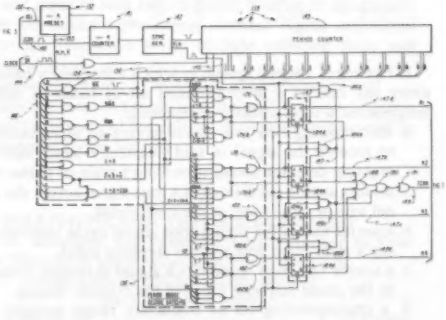
OUTPUT PROCESSING AND OUTPUT COUPLING CIRCUIT FOR A DIGITAL TONE RECEIVER

Glenn L. Richards, Rochester, N.Y., assignor to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed May 17, 1976, Ser. No. 686,772

Int. Cl.[2] H04M *1/50*

U.S. Cl. 179—84 VF **11 Claims**



1. For use in a tone signal system of a type in which a valid signal is characterized by the concurrent presence in first and second frequency channels of a selectively signalled first tone and a selectively signalled second tone, respectively, said first and second selectively signalled tones being one of a first tone set which may be present in said first channel and one of a second tone set which may be present in said second channel, respectively, the combination including:

a. first and second channel tone detectors operative to detect said first and second selectively signalled tones, respectively, said detectors each having a set of outputs corresponding to the tone set which may be present in the respective channel, each output of each set having two output states comprising an output state indicating presence of the corresponding tone and an output indicating absence of the corresponding tone,

b. a set of tone combination detector gates, said set of detector gates corresponding in number and individual associations to a predetermined set of combinations of one individual tone of the first tone set and of another individual tone of the second tone set, each detector gate of said set having first and second gate inputs connected to a distinct output of the first channel tone detector and to a distinct output of the second channel tone detector, respectively, each detector gate of said set being operative to propogate an ASSERTION state to its output when an ASSERTION state is simultaneously received at both of its gate inputs,

c. output buffer means for providing an output signal representing a detected tone combination of one individual tone of said first tone set and another individual tone of said second tone set,

d. means operatively connecting the outputs of the detector gates and the output buffer means, and

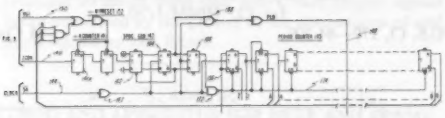
e. means for enabling said output signal of said output buffer means in response to presence of an ASSERTION state among the outputs of said set of detector gates and for interrupting an enablement of said output signal of said output buffer means in response to each new appearance at the output of any detector gate of an ASSERTION state, the operation to enable said output signal of said output buffer means being subordinate to the operation to interrupt said output signal of said output buffer means.

4,042,788

TONE DETECTOR

Glenn L. Richards, Rochester, N.Y., assignor to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed May 17, 1976, Ser. No. 686,774
Int. Cl.² H04M *1/50*
U.S. Cl. 179—84 VF **8 Claims**



1. For use in a signal system in which a frequency band may carry any one of a predetermined set of tones of differing frequencies, a tone detector comprising:

a. zero-crossing detector means having an input connected to receive the signal in said frequency band, said zero-crossing detector means providing a train of pulses representing analog excursions of a tone signal across the nominal axis of oscillation of the tone signal,

b. counter means for timing tone signal cycle intervals having a reset input and a count stepping input,

c. a source of a high speed clock signal drivingly connected to the count stepping input of the counter means,

d. a corresponding set of frequency range decoder gates responsive to predetermined ranges of output count conditions, said set of decoder gates being responsive to said output count conditions of the counter means as they exist at a time in a predetermined timed relationship to the time when the counter means reset input is actuated, and

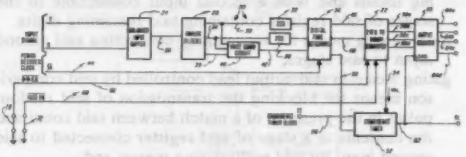
e. a ÷ N pulse frequency divider, the output of said zero-crossing detector means being propagated to the reset input of said counter means through the ÷ N pulse frequency divider, whereby the interval timed by the counter means is N times the interval of an individual cycle of a received tone signal.

4,042,789

TONE COMBINATION DETECTOR AND COINCIDENCE TIMER CIRCUIT

Glenn L. Richards, Rochester, N.Y., assignor to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed May 17, 1976, Ser. No. 686,773
Int. Cl.² H04M *1/50*
U.S. Cl. 179—84 VF **7 Claims**



1. For use in a tone signal system of a type in which a valid signal is characterized by the concurrent presence in each of first and second frequency channels of a selectively signalled first tone and a selectively signalled second tone, respectively, said first and second selectively signalled tones each being of first and second predetermined sets of tones, respectively, a tone receiver including the combination:

a. first and second channel tone detectors operative to detect said first and second selectively signalled tones, respectively, said detectors each having a set of outputs corresponding to the set of tones of the respective channel, each output of each set having two output states comprising an output state indicating presence of the corresponding tone and an output state indicating absence of the corresponding tone, p1 b. coincidence timer means operative to provide a validity confirmation signal upon substantially sustained existence for a predetermined duration of a state indicating presence of the corresponding tone at each of two outputs, one of said two outputs being of the set of outputs of the first channel tone detector, and the other of said two outputs being of the set of outputs of the second channel tone detector,

c. said coincidence timer means having a reset input, and upon the application of a reset signal to said reset input said coincidence timer means being operative to restart the timing of said predetermined duration, and

d. means responsive to a change in the output state of any of the individual outputs of both said channel tone detectors from a predetermined one of said two output states to the other state of said two output states, said latter means being operative to apply a reset signal to the reset input of the coincidence timer means.

4,042,790

VOICE GUARD CIRCUIT FOR A TONE RECEIVER

Glenn L. Richards, Rochester, N.Y., assignor to Stromberg-Carlson Corporation, Rochester, N.Y.

Filed May 17, 1976, Ser. No. 686,771
Int. Cl.² H04M *1/50*
U.S. Cl. 179—84 VF **12 Claims**

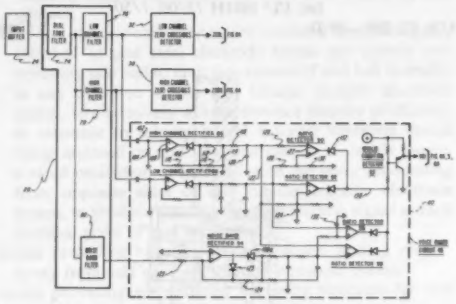
9. For use in a tone receiver of a type for the detection in an input signal of concurrent presence in each of first and second frequency bands of first and second selectively signalled tones, respectively, said first selectively signalled tone being a tone of any of a first predetermined set of tones, said second selectively signalled tone being a tone of any of a second predetermined set of tone, a voice guard circuit comprising:

a. first means, said first means being for deriving from said input signal a first derivative signal representing the input signal component which is in said first frequency band,

b. second means, said second means being for deriving from said input signal a second derivative signal representing

the input signal component which is in said second frequency band,

c. third means, said third means being for determining whether the ratio of the first derivative signal to the second derivative signal exceeds a predetermined upper limit which represents a threshold beyond which the input signal is deemed nonvalid,



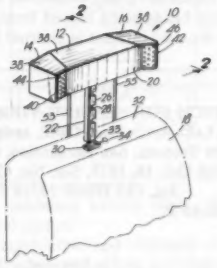
d. fourth means, said fourth means being for determining whether the ratio of the second derivative signal to the first derivative signal exceeds a predetermined upper limit which represents a threshold beyond which the input signal is deemed nonvalid, and

e. fifth means, said fifth means being for producing a tone receiver output inhibit signal in response to either of said third and fourth means determing that its respective ratio exceeds the corresponding predetermined upper limit.

4,042,791
STEREOPHONIC HEAD REST

Murriel L. Wiseman, Santa Clara, Calif., assignor to Murriel L. Wiseman, Santa Clara, Calif.

Filed Feb. 27, 1975, Ser. No. 553,579
Int. Cl.² H04R 5/02
U.S. Cl. 179—146 H **3 Claims**



1. A stereophonic head rest adjustably supported on a back rest of an automobile seat, which comprises:

a. a central back portion having a pair of distal ends and a front face;

b. a pair of side wing portions having a front face and a top surface, said front face of each said side wing portion having a plurality of openings therethrough;

c. a speaker unit affixed in each said side wing portion;

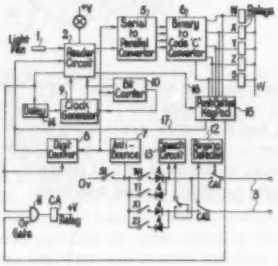
d. one said side wing portion hingedly attached onto each said distal end of said central back portion, said front face of each said side wing portion intersecting said front face of said central back portion at an obtuse angle; and

e. means for locking in position each said wing portion to said central back portion at prescribed obtuse angle, said means comprising pin members extending upwardly from said top surface of each said wing portion, a pair of elongated horizontal bar members having a plurality of evenly spaced holes therethrough adapted to receive said pin member, and means for rotatably attaching each said bar member onto said top surface of said central back portion at each said distal end thereof.

4,042,792
TELEPHONE SUBSCRIBER'S APPARATUS FOR SIGNALLING DECIMAL DIGIT VALUES REPRESENTED IN PRINTED FORM

William Edward Pakenham, Wellingborough, and Leonard Mayor Davis, Great Doddington, both of England, assignors to The General Electric Company Limited, London, England

Continuation-in-part of Ser. No. 517,922, Oct. 25, 1974, abandoned. This application Jan. 26, 1976, Ser. No. 652,088
Claims priority, application United Kingdom, Oct. 25, 1973, 49697/73
Int. Cl.² H04M 1/45
U.S. Cl. 179—90 R **2 Claims**



1. Apparatus at a telephone subscriber's station for signalling over an associated telephone line decimal digit values which are each represented on a generally planar surface as a series of adjacent areas of detectably differing light reflecting properties, comprising

A. a set of ten push-buttons, one for each decimal digit valve,

B. signalling means for signalling the identity of a wanted subscriber, said signalling means being arranged to be connected to said associated telephone line,

C. means to apply to said signalling means electric signals representing decimal digit values in response to operation of respective ones of said push-buttons,

D. manually-operable light pen means to illuminate a series of said areas in turn and to derive a series of signal voltages of values representing decimal digits, dependent upon the respective levels of light reflected from said series of areas,

E. means temporarily to store said signal voltages, and

F. convertor means to apply to said signalling means electric signals in respect of the decimal digit value represented by said stored signal voltages.

4,042,793
TELEPHONE MOUTHPIECE KEYBOARD

Donald M. Bellenger, San Francisco, Calif., assignor to Telephone Electronics Corporation, San Francisco, Calif.

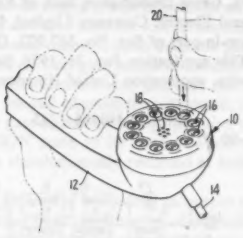
Filed Dec. 29, 1975, Ser. No. 644,375
Int. Cl.² H04M 1/50
U.S. Cl. 179—90 K **17 Claims**

1. Apparatus for providing tone operating capability to a dial telephone in which the standard mouthpiece including the microphone normally electrically coupled to one or more transmitter connections in the telephone is removed, said apparatus comprising a replacement mouthpiece attachable to said telephone in place of the standard mouthpiece, said replacement mouthpiece including:

a relatively small microphone having a sound receiving

element, said relatively small microphones being electrically coupled to the transmitter connections upon attachment of the mouthpiece to said telephone;

a plurality of keyboard elements located generally around the sound receiving elements of the relatively small microphone, said keyboard elements corresponding to respective telephone operating digits and symbols and adapted to be individually actuated by a user of the telephone; and



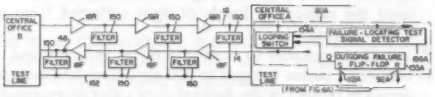
means for generating an electrical output signal representing a tone signal responsive to the actuated keyboard elements, said generating means being electrically coupled to the transmitter connections upon attachment of the replacement mouthpiece to said telephone to provide tone operating capability to said telephone.

4,042,794

METHOD AND MEANS FOR DETECTING AN OUTGOING FAILURE IN A BIDIRECTIONAL COMMUNICATIONS SPAN AND LOOPING THE SAME IN RESPONSE THERETO

Paul J. Lima, and Todd V. Townsend, both of Washoe County, Nev., assignors to Lynch Communication Systems, Reno, Nev.

Division of Ser. No. 544,483, Jan. 27, 1975, Pat. No. 3,983,340.
This application Sept. 25, 1975, Ser. No. 616,654
Int. Cl.[2] H04B *3/46*
U.S. Cl. 179—175.3 R **3 Claims**



3. In a communication system in which information is conveyed between first and second spatially separated terminals over a span which includes a first communication path over which information is transmitted from said first to said second terminal, and a second communication path over which information is transmitted from said second terminal to said first terminal, the improvement comprising:

a. means at said first terminal for detecting a failure of said span;

b. means at said first terminal for detecting whether said failure is in said first or said second communication path; and

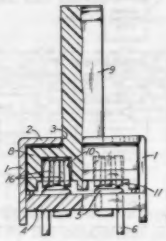
c. means at said first terminal for looping said first and second paths at said first terminal, said looping means being inoperative unless a failure is detected in said first communication path.

4,042,795

SLIDE SWITCH CONTACT HAVING PLURAL FLEXIBLE SLATS PROVIDING MAKE BEFORE BREAK CONTACT ENGAGEMENT

Allan J. Sykora, Cary, N.C., assignor to Stackpole Components Company, Raleigh, N.C.

Filed June 28, 1976, Ser. No. 700,393
Int. Cl.[2] H01H *15/00, 1/50*
U.S. Cl. 200—16 D **8 Claims**



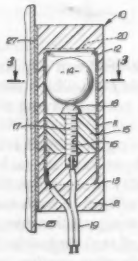
1. An electric slide switch comprising a row of at least three fixed electric contacts, a slide movable back and forth along said row and having a recess therein facing the contacts and extending lengthwise of said row, and a shorting contact disposed in said recess and movable by the slide along the row of fixed contacts, said shorting contact being formed from a spring metal strip having an elongated central body between a pair of end portions, said body having a contact surface for sliding engagement with the fixed contacts and being long enough to bridge three fixed contacts simultaneously, said end portions extending toward the back wall of said slide recess and toward each other to form legs inclined to said body with their free ends pressing against said back wall to press said contact surface against the fixed contacts, said central body being provided with at least one slot extending the full length thereof and into said legs to separate said body into laterally spaced contact bands integrally connected at said free ends of said legs, and said bands being bowed lengthwise toward said legs before the shorting contact is inserted in the slide recess.

4,042,796

INERTIA SWITCH FOR SENSING VIBRATION FORCES

Henry R. Zink, Lake Arrowhead, Calif., assignor to Zink Enterprises Security Systems, San Bernardino, Calif.

Filed Oct. 15, 1975, Ser. No. 622,474
Int. Cl.[2] H01H *35/14*
U.S. Cl. 200—61.45 R **3 Claims**



1. In a security monitoring vibration sensor, the combination of:

a metal ball;

an axial metallic electrode means providing a tangential supporting contact with said ball from beneath, the area of said contact being concentrated approximately at the

nadir of the vertical axis of said ball, said axial electrode means thus making a constantly good electrical connection with said ball, while shifting slideably horizontally relative to said ball, in responding rapidly to external vibrations, without substantially overcoming the inertia of said ball as to disturb its position of rest in which it is slideably supported on said axial electrode means by said contact;

a tubular metallic electrode means insulated from but rigidly attached to said axial electrode means and closely surrounding said ball to limit movements of said ball laterally, in any direction within said tubular metallic electrode means, to a relatively minute distance thereby producing, in response to minute lateral external vibration forces being imposed on said axial and tubular electrode means, a rapid oscillation of said ball with the latter rebounding from opposite sides of said tubular metallic electrode means, to produce a strong warning electric signal at each terminal point of said oscillation;

means providing opposite phase terminals leading respectively from said axial and tubular electrode means;

means providing an insulating enclosing structure for said sensor; and

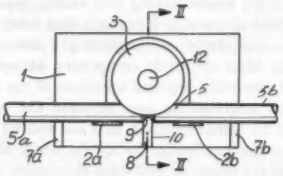
means for securing the sensor in vertical position on a building the security of which is being monitored.

4,042,797

ELECTRIC SAFETY SWITCH WITH POSITIVE-ACTION MECHANISM

Manuel Alexandre Vincent De Araujo, Chamoux-sur-Gelon, and Marcel Vouthier, Chateauneuf, both of France, assignors to Manuel Alexandre Vincent De Araujo, Chamoux-sur-Gelon, France

Filed Sept. 4, 1975, Ser. No. 610,396
Claims priority, application France, Sept. 4, 1974, 74.30949
Int. Cl.² H01H *3/00*
U.S. Cl. 200—153 R **7 Claims**



1. An electric switch, comprising:

an electrically insulating switch body carrying electric switch terminal means;

an electrically conductive rod disposed to permit movements thereof, along and across and angularly to the extension of the rod, into and out lateral surface contact of the rod with the terminal means;

a retaining member mounted on the switch body and movable between a rod-releasing position and rod-holding position of the member, for releasably holding the rod in said contact in the rod-holding position of the retaining member;

means for elastically biasing the retaining member to its rod-holding position;

manually-actuable handle means releasably engageable for moving the retaining member from the rod-holding to the releasing position to permit manual placing of the rod into said contact, whereby the biasing means positively but releasing maintains said contact when the handle means is released; and

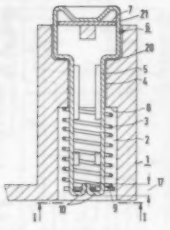
means on the switch body defining a bearing surface for lateral contact and cooperation with the rod to release the rod from the holding thereof by the retaining member is response to any of the movements of the rod.

4,042,798

MOUNTING DEVICE FOR COMPRESSION SPRING

Heinz Seidenbusch, Sulzbach Rosenberg, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed July 14, 1975, Ser. No. 595,495
Claims priority, application Germany, July 31, 1974, 2436885
Int. Cl.² H01H *1/20*
U.S. Cl. 200—243 **2 Claims**



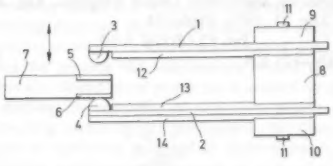
1. In an electrical switching apparatus, a mounting device for a contact pressure spring, said apparatus including a contact bridge carrier including first and second openings, and a breakthrough opening connecting said first opening to said second opening, each of said openings being disposed about the longitudinal axis of said carrier, and a pull bracket including a main portion and a plurality of arms extending longitudinally from the main portion, said main portion being disposed in said first opening, said plurality of arms extendng through said breakthrough opening into said second opening, the spring being disposed in said second opening, and said plurality of arms being disposed within and extending beyond the coils of the spring, the improvement comprising a washer including a plurality of crosspieces describing a plurality of cutouts correspondingly aligned with each of said plurality of arms, said plurality of arms passing through said cutouts and being bent back around a corresponding one of said crosspieces, locking said washer in place and retaining said spring.

4,042,799

DAMPING OF CONTACTS

Hans Werner Reuting, Peine, Germany, assignor to ELMEG Elektro-Mechanik GmbH, Peine, Germany

Filed Sept. 15, 1975, Ser. No. 613,362
Claims priority, application Germany, Sept. 21, 1974, 2445176
Int. Cl.² H01H *3/60*
U.S. Cl. 200—288 **8 Claims**



1. Contact arrangement in switching devices having at least one movable contact and a stationary contact mounted on a contact spring;

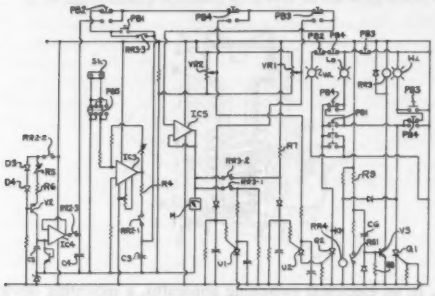
means for clamping one end of the contact spring, the contact spring having at least one of its flat surfaces at least partially covered individually by a plastic foil, being bonded thereto and extending into a zone of clamping as between said means and the one spring end for offsetting positioning tolerances, said foil having low cold flow characteristics and high reversible elasticity such as exhibited by a polysulfonic plastic.

4,042,800

WELDING APPARATUS

Paul A. Glorioso, Amherst, Ohio, assignor to TRW Inc., Cleveland, Ohio

Filed Feb. 9, 1976, Ser. No. 656,188
Int. Cl.[2] B23K 9/20
U.S. Cl. 219—98 **5 Claims**



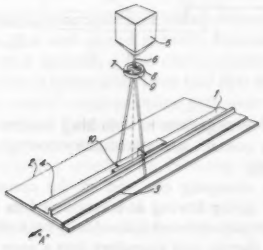
1. Apparatus for end welding a stud to a workpiece comprising means for holding a stud, an electrically operated retraction coil for retracting the stud-holding means away from the workpiece, means including a conductor for supplying electrical power to said retraction coil, current means including a conductor for supplying welding current to said stud-holding means, a shunt associated with said current means for effecting an electrical signal responsive to the magnitude of the welding current, a first capacitor, means responsive to the signal for charging said first capacitor, a second capacitor, a constant source of current for charging said second capacitor, means associated with one of said conductors for connecting said shunt to said first capacitor and for connecting said constant source of current to said second capacitor while current is flowing through the associated conductor, a meter, means for selectively connecting said first capacitor and said second capacitor to said meter, means for preventing an additional weld cycle if the welding current for the previous cycle was below a predetermined minimum, and means for preventing an additional weld cycle if the welding current for the previous cycle was above a predetermined maximum.

4,042,801

ELECTRON BEAM APPARATUS

Cecil Arthur Joseph Gay, and Leslie George Henry Rockey, both of Bristol, England, assignors to British Aircraft Corporation Limited, London, England

Filed Aug. 19, 1975, Ser. No. 605,882
Claims priority, application United Kingdom, Aug. 31, 1974, 38163/74; Aug. 31, 1974, 38164/74
Int. Cl.[2] B23K 9/00
U.S. Cl. 219—121 EB **5 Claims**



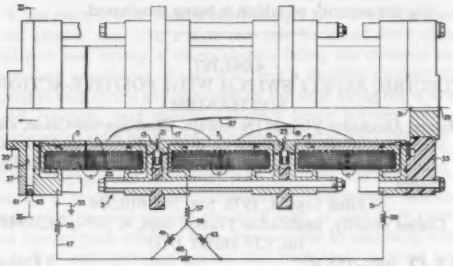
1. Electron beam welding apparatus including, in combination, an electron gun for generating an electron welding beam, means for traversing a workpiece relative to the beam, an annular ferro-magnetic yoke having diametrically opposed internal poles thereon, a pair of beam deflecting coils on each pole for deflecting the beam transversely relative to the direction of movement of the workpiece, one coil of each pair being connected in series with a coil of the other pair in a sense such that the voltage induced in one pair of series connected coils by a collapsing deflection current in the other pair of series connected coils assists the rising deflection current in the first mentioned pair of series connected coils, and vice versa, and supply means for supplying the two pairs of series connected coils alternately with energizing current of substantially square waveform to deflect the beam alternately between two transversely spaced welding positions.

4,042,802

THREE-PHASE ARC HEATER

Maurice G. Fey, Plum Borough, and Charles B. Wolf, Irwin, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 11, 1975, Ser. No. 603,611
Int. Cl.[2] B23K 9/00
U.S. Cl. 219—121 P **4 Claims**



1. A three-phase heater system as a high energy heat source, comprising an arc heater having two axially spaced, substantially cylindrical electrodes forming a first intermediate gap therebetween, one electrode comprising a downstream electrode and the other electrode comprising an upstream electrode, a thrid electrode disposed upstream of the intermediate gap, a second intermediate gap between the upstream the electrode and the third electrode, first and second means spacing an elecrically insulating the downstream and upstream electrodes and the upstream and third electrodes, respectively, and comprising means for channeling gas to be heated at a high velocity to the gaps, a three-phase delta-connected power source comprising one conductor for each phase and connected separately to the electrodes, a ground conductor connected to the downstream electrode, a ground conductor connected to the dowsntream electrode, and a gas inlet port disposed at the exit end of the arc heater and having a plurality of peripherally spaced gas inlets extending tangentially to the periphery of a product material flowing from the arc heater, whereby a swirling movement is imparted to the product material.

4,042,803

BODY HEATING AND STRETCH SUPPORT DEVICE

Edgar P. Bickford, Danbury, Conn., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

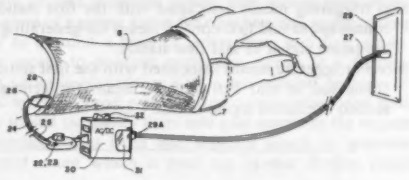
Filed Jan. 28, 1976, Ser. No. 653,138
Int. Cl.[2] H05B 1/00
U.S. Cl. 219—211 **2 Claims**

1. A body heating and stretch support device, comprising a sheet of stretch support material adapted to be supported on a part of a human body in contact therewith, said sheet of material having an elastic band for adjusting the size thereof to fit different sized people and a plurality of

zippers for fastening selected segments of the sheet to each other;

electric heating means embedded in the material; and

energizing means for releasably electrically connecting the heating means to a source of electrical energy for selectively heating the part of the body contacted by the sheet of material, said energizing means including electric switch means, electric resistance means, electrically conductive means connecting the switch means and resistance



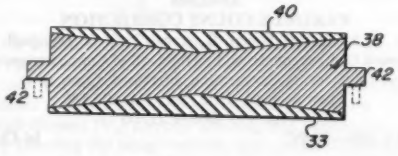
means in series, said conductive means having spaced opposite ends, a housing having fastening means thereon for removably affixing it to clothing of a user, electric power supply means in the housing, and a pair of electrical connector plugs each connected to a corresponding end of the conductive means for making electrical contact with the heating means and with a source of electrical energy via the power supply means and an AC/DC switch in the housing for connection to either an AC or a DC source of electrical energy.

4,042,804

ROLL FUSER APPARATUS

Rabin Moser, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Sept. 24, 1975, Ser. No. 616,452
Int. Cl.[2] H05B *1/00*; G03G *15/00*
U.S. Cl. 219—216 **11 Claims**



1. Fuser apparatus for fixing toner images to substrate material, said apparatus comprising:

a fuser roll member;

a backup roll member;

means for effecting engagement of said roll members to apply a force between said roll members to thereby form a nip therebetween through which said substrate material passes with said toner images contacting said fuser roll said means also effecting disengagement to remove said force;

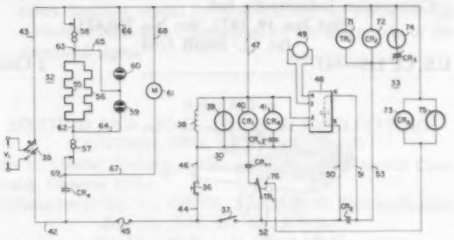
one of said roll members comprising a rigid thermally stable core and an outer layer which has a substantially uniform circumference along its longitudinal axis when said force is not applied and when said force is applied has a non-uniform circumference along its longitudinal axis whereby portions thereof adjacent its ends have a longer surface length than the center portion thereof whereby the edges of said substrate material are moved through said nip at a faster speed than the center thereof.

4,042,805

STERILIZING APPARATUS

Bernard F. Kopacz, Little Falls, N.J., assignor to Becton, Dickinson and Company, Rutherford, N.J.

Filed Dec. 18, 1974, Ser. No. 533,830
Int. Cl.[2] H05B *1/02*
U.S. Cl. 219—492 **7 Claims**



1. Sterilizing apparatus comprising:

a chamber for receiving objects to be subjected to elevated temperatures for predetermined intervals, said chamber including door means and means for sensing the opened and closed condition of said door means;

heater means in fluid communication with said chamber;

heater control means for selectively energizing said heater means, said heater control means exhibiting temperature sensitive characteristics and active, when enabled, to maintain the operation of said heater means in the vicinity of a predetermined temperature by the selective energizing and de-energizing thereof, said heater control means comprising first and second temperature controller means disposed in a primary and back-up relationship with respect to said heater means, each of said first and second temperature controller means controlling the application of operating potential to said heater means and being capable of selectively energizing or de-energizing said heater means;

program initiation means for starting a cycle of operation of said sterilizing apparatus, said program initiation means including cycle controlling means, means for sensing the temperature within said chamber and means for momentarily applying potential to said cycle controlling means, said program initiation means being operatively connected to said heater control means and said door condition sensing means and operative upon an enabling of said means for momentarily applying potential to said cycle controlling means to momentarily apply operating potential to said heater control means and said means for sensing the temperature within said chamber means, said cycle controlling means active upon a momentary application of operating potential thereto to continue an application of operating potential to said heater control means and said means for sensing the temperature within said chamber means if a closed door condition is sensed by said means for sensing the condition of said door means, said cycle controlling means being responsive to the disruption in a supply of operating potential to cause a resetting of said sterilizing apparatus whereupon a new cycle of programmed operation must be initiated;

automatic timer means for defining said predetermined intervals during which said objects are to be subjected to said elevated temperature, said automatic timer means being connected to said cycle controlling means and said means for sensing the temperature within said chamber, said automatic timer means being active to initiate a timing of said predetermined interval upon a detection of a selected temperature within said chamber by said means for sensing the temperature within said chamber and further active upon an expiration of a predetermined interval for de-energizing said cycle controlling means whereupon the application of operating potential to said heater control

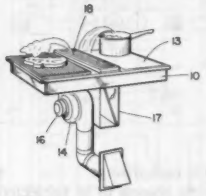
means and said means for sensing temperatures within said chamber is terminated.

4,042,806

VENTILATED RANGE WITH PLUG-IN COOKING UNITS

Edward O. McCartney, Greenfield, Ind., assignor to Jenn Air Corporation, Indianapolis, Ind.

Filed Jan. 19, 1977, Ser. No. 760,621
Int. Cl.[2] H05B *3/68*
U.S. Cl. 219—447 **2 Claims**



1. A range of the type having a recessed upper surface receiving a plug-in electrical broiling element and a plug-in surface cooking cartridge having a plurality of electrical heating units, an electric motor driven fan disposed below the recessed upper surface for drawing air across said surface to ventilate the upper surface area, manualy operable control switches for setting the power input to said broiling element and to each of the heating units in said cartridge, a single one of said switches controlling either said broiling element if it is in place in said recessed surface and one of said heating units if the cartridge is in place in said recessed surface, a receptacle disposed in said recessed upper surface, said cartridge and said broiling element each having a pronged plug adapted to be received in the receptacle, circuit means connecting said receptacle across an electrical power source through said control switches and connecting the fan driving motor to one side of said power source and to said receptacle, said range being characterized by the pronged plug associated with said broiling element having power input prongs connecting said element across the power source when inserted in the receptacle and an additional prong electrically connected to that one of said power input prongs having electrical continuity to the other side of said power source, said additional prong connecting, through said receptacle, to the fan motor, said pronged plug of the cartridge element being characterized by an absence of a counterpart of said additional prong, whereby said fan motor is energized whenever said broil element is energized through said one single control switch but is not energized through said receptacle when said one of the heating units of the cartridge is energized through said one single control switch.

4,042,807

APPARATUS FOR THE PROCESSING OF DOCUMENTS

Claude Jules Donabin, Angers, and Denis L. J. G. Mercier, St. Georges, Loire, both of France, assignors to Compagnie Honeywell Bull, Paris, France

Filed Nov. 14, 1975, Ser. No. 631,998
Claims priority, application France, Nov. 12, 1974, 74.40830
Int. Cl.[2] G06K *1/12, 13/00*; B65H *3/44*
U.S. Cl. 235—61.11 R **8 Claims**

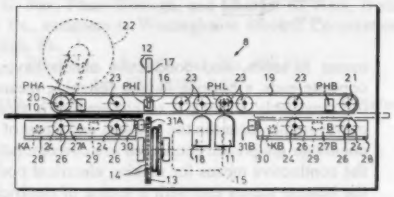
1. In an apparatus for handling rectangular documents, said apparatus being of a type having a reading device, first and second stations respectively arranged at each of two ends of the reading device to contain only one document to be handled, each of said stations including means to feed in and receive said document, and a conveyor means to transport said document between said two stations so that said document passes adjacent the reading device, said reading device reading information carried by said document only when said document is moved in a direction running from the first station to the second;

first feed-controlling means coupled to said conveyor means and controlling said feed means for feeding said document continuously in a direction from the first station to the second station;

second feed-controlling means coupled to said conveyor means and controlling said feed means for feeding said document continuously in a direction from the second station to the first;

first triggering means associated with the first station and connected to said first control means for generating a first excitation signal to said first station;

second triggering means associated with the first station and connected to said first control means for generating a second excitation signal to said second station;



detector means located along a path followed by the document at said reading device for generating a control signal in response to the document passing said reading device; and

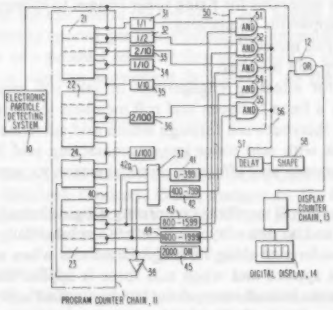
change over means connected to said first and second control means, said first and second triggering means and said detector means, said change over means responsive to an excitation signal generated by one of said triggering means for directing said control signal generated by said detector means to (1) the control means associated with said one of said triggering means to halt the movement of the document, and (2) the control means associated with the other triggering means to return the document to the station into which it was originally placed.

4,042,808

PARTICLE COUNT CORRECTION

James W. Hennessy; Henry R. Angel, both of Trumbull, and Bernard O. Bachenheimer, Fairfield, all of Conn., assignors to Angel Engineering Corporation, Stratford, Conn.

Filed Aug. 11, 1975, Ser. No. 603,586
Int. Cl.[2] G06M *11/00*
U.S. Cl. 235—92 PC **16 Claims**



1. In apparatus for counting, said apparatus having detector means to emit a pulse for each detection, thereby generating a sequence of counting pulses, said apparatus having a display

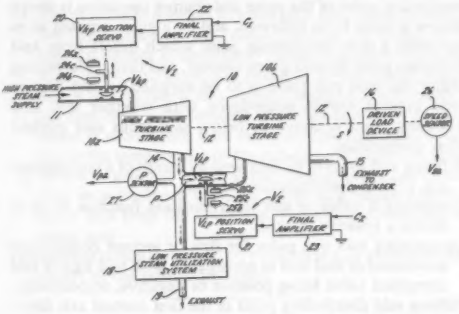
counter device for providing a read-out of the pulses generated by the detector means; the improvement comprising means to correct the count to compensate for errors introduced by the mode of detection and recording, comprising a program counting device, means to feed said counting pulses into the input of said program counting device, said program counting device having a plurality of output means, one group of said output means each providing a train of pulses at different frequencies, a second group of said output means each for providing in sequence a gating signal during an interval spanning selected numbers of said counting pulses, gate means responsive to application of a gating signal from said second group of output means to transmit a train of pulses from said first group of output means to produce correction signals at a frequency which varies in accordance with a pre-selected program controlled by said second group of said output means, and adding means to add the pulses from said gate means to the sequence of counting pulses from said detector means to generate a corrected count which is read out in said display counter device.

4,042,809

SYSTEM FOR CONTROLLING TWO VARIABLES

Terry A. Shetler, Fort Collins, Colo., assignor to Woodward Governor Company, Rockford, Ill.

Filed Aug. 23, 1976, Ser. No. 717,007
Int. Cl.[2] G05B *6/02*
U.S. Cl. 235—150.1 **14 Claims**



1. In a system for controlling first and second variables (S and P) by variably exciting first and second control elements (V_1 and V_2), said first element (V_1) directly affecting both variables as its excitation is increased or decreased, and said second element (V_2) directly affecting one variable but oppositely affecting the other variable, said system including:

a. means for creating a first error function signal (E_s) which varies according to the error between set point and actual values of one controlled variable,

b. means for creating a second error function signal (E_p) which varies according to the error between set point and actual values of the other controlled variable,

c. means for combining said first and second error function signals to create a first command signal (C_1) which varies with a cumulative effect of changes in such function signals,

d. means for combining said first and second error function signals to create a second command signal (C_2) which varies with a differential or opposite effect of changes in the respective function signals,

e. means for exciting the first control element (V_1) with said first command signal to increase or decrease said two variables, and

f. means for exciting the second control element (V_2) with said second command signal, thereby to increase or decrease one of said variables while respectively decreasing or increasing the other variable,

the improvement which comprises

g. means responsive to one of said error function signals (E_s or E_p) for creating a threshold signal (T) which varies as a predetermined function of such one signal, and

h. means for supplying to one of said means (c) or said means (d) either (i) the other of the function signals (E_p or E_s) or, in lieu thereof, (ii) said threshold signal, —whenever said other function signal lies respectively (i) within or (ii) without a boundary represented by the magnitude of the threshold signal.

4,042,810

METHOD AND APPARATUS FOR FACILITATING CONTROL OF A RAILWAY TRAIN

John E. Mosher, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Continuation of Ser. No. 436,700, Jan. 25, 1975. This application July 25, 1975, Ser. No. 599,043
Int. Cl.[2] B61G *1/08;* **G06F** *15/20*
U.S. Cl. 235—150.2 **82 Claims**

1. A method for facilitating control of a railway train having at least one locomotive in a locomotive set and a plurality of cars successively linked thereto proceeding on a track over a predetermined route of travel, wherein each car of said plurality of cars has a coupler transmitting a coupling force between said car and that portion of the train which precedes said car over the predetermined route of travel, comprising:

the step of

providing said train with a means for processing data including a memory for storing data, and a control system for transferring data received by said data processing means into said memory and for combining said data in said memory in accordance with a predetermined sequence of operations including performing predetermined calculations for determining a representation of said coupling force for each car;

the step of

locating the position of each car in said train on said track over the predetermined route of travel and storing said positions in said memory;

the step of

storing in said memory the coupling force representation of each car in said train calculated by said control system responsive to said located position of each car; and

the step of

displaying to the operator of said locomotive set, as the train proceeds along said predetermined route of travel, the coupling force representation stored for each car.

4,042,811

TOMOGRAPHY SYSTEM HAVING AN ULTRAHIGH-SPEED PROCESSING UNIT

Carl J. Brunnett, Mayfield Heights, Ohio, and Vernon W. Gerth, Jr., Kirkwood, Mo., assignors to Picker Corporation, Cleveland, Ohio

Filed Nov. 28, 1975, Ser. No. 636,217
Int. Cl.[2] G01T *1/16;* **G06F** *15/52*
U.S. Cl. 235—151.3 **19 Claims**

1. A transverse section tomography system for providing a reconstructed image of a planar section of a subject, comprising:

a. a movably supported radiation detector for detecting radiation which has passed through the planar section of the subject and for generating a sequence of scan data signals indicative of the intensity of the radiation after it has passed through the subject, said scan data signals being generated at predetermined orientations and positions whereby detection of the radiation at a given orientation and position defines a scan element and detection of the radiation at all predetermined orientations and positions defines a scan cycle; and,

b. control apparatus responsive to the sequence of scan data signals for generating a set of repeatedly updated, elemental image signals characterizing structure of the planar section of the subject, said control apparatus including:

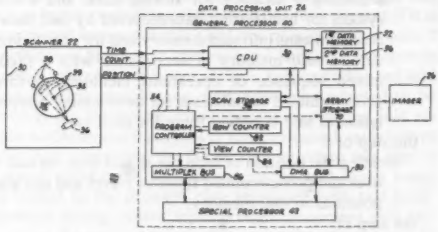
i. input storage means for storing the respective scan data signals in particular input storage locations;

ii. filter processing means coupled to the input storage for retrieving the scan data signals from the input storage means and for producing filtered scan signals from the retrieved scan data signals which filtered scan signals each respectively represent the contribution to the reconstructed image of each of the corresponding retrieved scan data signals;

iii. a scan storage apparatus having multiple storage locations for retrievably storing the filtered scan signals in locations corresponding to the contribution to the image of the stored filtered scan signals and corresponding to scan elements occurring at predetermined orientations of the scan cycle during which the stored signals are produced;

iv. array storage means for storing as they are generated, elemental image signals which are to be repeatedly updated; the elemental image signals being stored in successive array storage locations each array storage location respectively corresponding to a preselected point of an array of points of said planar section;

v. an array storage address calculator for addressing a



selected array storage location containing the elemental image signal corresponding to a selected one of said preselected points of the planar section;

vi. a scan storage address calculator for addressing at least one of a predetermined range of selected scan storage locations adjacent a selected location corresponding to a said preselected point, said range of locations containing at least one of a set of filtered scan signals each representing radiation detected in a given scan element which contributed to the representation of the reconstruction of the image at said preselected point;

vii. a processing unit for combining the addressed filtered scan signal with the addressed elemental image signal to provide one of the updated, elemental image signals;

viii. said scan storage address calculator including a first storage means for storing the address of a said selected scan storage location and a second storage means for storing an incremental value indicative of the number of scan storage locations separating said selected scan storage location and a scan storage location corresponding to a next subsequent preselected point to be updated; and,

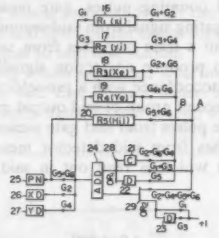
ix. means coupling the processing unit to the first and second storage means, whereby the processing unit combines said address with said incremental value to provide the address of said next point.

4,042,812

PULSE DISTRIBUTION METHOD AND APPARATUS

Yoshihiro Hashimoto, Hachioji, and Shinichi Isobe, Tachikawa, both of Japan, assignors to Fujitsu Fanuc Limited, Tokyo, Japan

Filed Oct. 2, 1975, Ser. No. 618,762
Claims priority, application Japan, Oct. 12, 1974, 49-117435
Int. Cl.[2] G05B *19/18*
U.S. Cl. 235—151.11 **13 Claims**



1. A pulse distribution method for a numerically controlled machine tool having two control axes which include a first control axis having a smaller resolution and a second control axis having a larger resolution by a given ratio, wherein said method comprises transmitting one pulse of said machine tool for moving said machine tool in a direction along said first and second control axis, respectively, in accordance with whether a distributing point of the pulse distributing operation is above or below a locus to be followed, and by a given amount so as to establish a new distributing point which differs from said distributing point by said given amount, and then, determining whether the next one pulse is to be supplied to said first or second control axis in accordance with whether said new distributing point is above or below said locus said method further comprising:

defining said locus to be followed by means of a corresponding, related discrimination function;

computing a value of said discrimination function so as to derive a polarity thereof;

transmitting said one pulse for first or second control axis movement of said tool in accordance with said sign of said computed value being positive or negative, respectively;

shifting said distributing point in the first control axis direction by the smaller resolution when said one pulse is transmitted for said first control axis movement; and

when said one pulse is supplied to said second control shifting said distributing point in the second control axis direction by said larger resolution when said one pulse is transmitted for said second control axis movement.

4,042,813

SECONDARY SYSTEM MODELING AND METHOD FOR A NUCLEAR POWER PLANT TRAINING SIMULATOR

Steven J. Johnson, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 335,293, Feb. 23, 1973, abandoned.
This application Oct. 31, 1974, Ser. No. 519,722
Int. Cl.[2] G09B *9/00*; G06F *15/06*
U.S. Cl. 235—151.21 **40 Claims**

1. An automated training simulator for the real-time dynamic operation of a power plant having a secondary system including a heat exchanger which increases the temperature of reheatable steam between stages of a steam turbine with reheat steam from a steam generating means, comprising:

a console having a plurality of command devices to generate input data;

calculating means including sequencing means having the following components;

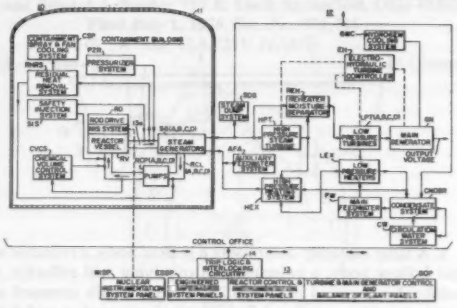
a. means to generate a data value relating to the mass of reheatable steam in the heat exchanger in accordance with

data values relating to inlet flow and outlet flow and heat transfer,

b. means to generate a data value relating to the specific volume of steam in the heat exchanger in accordance with generated data values relating to mass and volume,

c. means to generate a data value relating to the temperature of the reheatable steam in the heat exchanger in accordance with data values relating to enthalpy and specific volume of the reheatable steam,

d. means to generate a data value relating to enthalpies of the reheatable and the reheat steam in accordance with an instantaneous energy balance equation for each enthalpy,



e. means including means to generate a data value relating to the temperature of the reheat steam at the outlet of the heat exchanger in accordance with a constant and a data value related to generated enthalpy of the reheat steam,

f. means to generate a data value relating to heat transfer in the heat exchanger between the reheat and the reheatable steam in accordance with the generated data values relating to the temperature of the reheat and reheatable steam,

g. means to generate a data value relating to inlet and outlet flow in accordance with the input data values including input data from the operation of the console control devices; and

indicating means governed by predetermined generated data values of the reheatable steam.

4,042,814

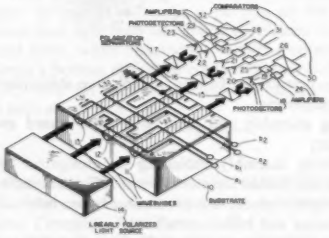
ELECTRO-OPTIC BINARY ADDER

Henry F. Taylor, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 28, 1976, Ser. No. 700,683

Int. Cl.² G06F 7/56

U.S. Cl. 235—175 **9 Claims**



1. An electro-optic adder for summing binary addends having N bits comprising:

an electrically non-conductive substrate;

N + 1 optical waveguides supported by said substrate,

said waveguides being of electro-optic material exhibiting linear change of refractive index in response to an electric field impressed thereacross;

a source of linearly polarized light adapted to transmit its output light energy along each of said waveguides;

a plurality of electrodes connectable to a source of electrical potential representative of a binary bit and having discrete lengths L contiguous to said waveguides for impressing electric fields thereacross,

said lengths L in the jth waveguide corresponding to the nth bit in each addend being determined by the relationship

$$L_{jn} = 2^{n-j}\mathbf{1}_{\pi}, \text{ when } n \leq j, \text{ and}$$

$$L = 0, \text{ when } n > j$$

where 1_{π} is the length required for a pi-radian phase retardation of light propagation in the waveguides upon application of said electrical potential;

a polarization separator receiving the output of each waveguide for producing signals commensurate with the orthogonally polarized components of said output;

a photodetector responsive to each of said signals representing said components for producing an electrical signal representative thereof;

means for amplifying each said electrical signal; and an analog comparator for receiving the amplified electric signals derived from the orthogonally polarized components of light energy output of each of said waveguides for producing a binary output signal representative of the relative amplitudes of its received signals.

4,042,815

ELECTRONIC MULTIPLIERS

Kenneth Robson Brown, Beamish, and Colin Keith Sharp, Edinburgh, both of Scotland, assignors to Ferranti Limited, Lancashire, England

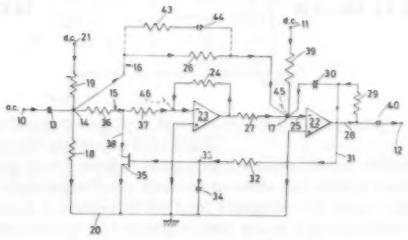
Division of Ser. No. 507,422, Sept. 19, 1974, Pat. No. 3,963,912.

This application Jan. 16, 1976, Ser. No. 649,838

Claims priority, application United Kingdom, Sept. 22, 1973, 44550/73

Int. Cl.² G06G 7/16

U.S. Cl. 235—194 **11 Claims**



1. An electronic multiplier circuit comprising a first input terminal to which an a.c. signal is applied, a junction point, two parallel paths connected between the input terminal and the junction point, signal level adjusting means included in one of said parallel paths, a second input terminal to which a d.c. signal is applied, a third path connected to said second input terminal, an output terminal, and control means connected between the junction point and the output terminal and responsive to any imbalance of d.c. components in said parallel paths and to a d.c. signal in the third path to produce a control signal for varying the signal level adjusting means so as to reduce said d.c. imbalance, whereby a.c. components in said two parallel paths are unbalanced to an extent proportional to the d.c. signal applied to the second input terminal.

4,042,816

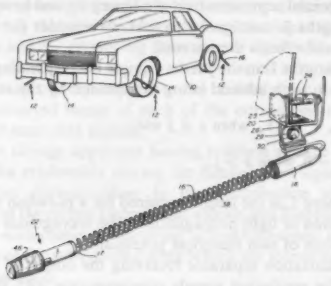
ILLUMINATED CURB FEELER

Joseph Smoot, 127 Alexander St., Dorchester, Mass. 02125

Filed Feb. 2, 1976, Ser. No. 654,412

Int. Cl.[2] B60Q *1/00*

U.S. Cl. 240—8.1 R **13 Claims**



1. An illuminated curb feeler for use with a motor vehicle comprising;

an elongated member,

means at one end of the member for supporting the member from the vehicle extending outwardly from the vehicle to position said curb feeler to contact a curb,

a lamp socket,

means for securing the socket to the other end of the member,

a lighting assembly received by the socket and including a bulb when said assembly contacts a curb and means encapsulating the bulb to protect the bulb,

and means for coupling power to the socket to illuminate the bulb.

4,042,817

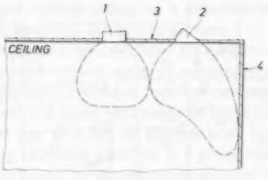
QUASI-INDIRECT MONOSYMMETRICAL LIGHTING SYSTEM

Albert C. McNamara, Jr., 210 E. Mimosa Circle, San Marcos, Tex. 78666

Continuation-in-part of Ser. No. 376,320, July 5, 1973, abandoned. This application June 24, 1975, Ser. No. 589,947

Int. Cl.[2] F21S *3/02*

U.S. Cl. 240—9 R **14 Claims**



1. In combination with a room ceiling and an adjoining vertical light-reflective wall, a peripheral lighting arrangement, comprising at least one flush-mounted light fixture for producing monosymmetrical light distribution recessed in said ceiling, spaced in close proximity apart from said wall; said spacing beng .3 to .5 of the distance from said ceiling to the elevation below at which the optimum illumination is desired, said elevation below said ceiling at which the optimum illumination is desired being located in the lower vertical one-half of the room, and having a main light distribution pattern directed downward from said fixture toward said wall, said light distribution pattern being at an angle between 30° and 70° to said ceiling, the impinging and reflected light to and from said wall producing an average contrast rendition factor in the work task area of the room in excess of that produced by a substantially identical peripheral lighting arrangement involving one or more light fixtures producing axially symmetrical light distribution.

4,042,818

LAMP ASSEMBLY

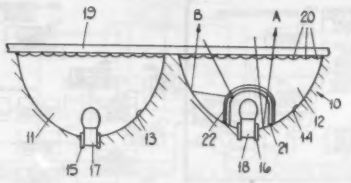
Stanley Green, Warley, England, assignor to The Lucas Electrical Company Limited, England

Filed Mar. 16, 1976, Ser. No. 667,336

Claims priority, application United Kingdom, Apr. 1, 1975, 13307/75

Int. Cl.[2] F21V *13/14*

U.S. Cl. 240—41.3 **12 Claims**



1. A lamp assembly comprising a hollow body, a reflector in said hollow body, a colorless lens overlying said reflector, a bulbholder disposed in said hollow body, a bulb mounted in said bulbholder, a colored filter element mounted in said hollow body and completely covering said bulb, and a neutrally colored light-absorbing material completely covering a surface of said colored filter element remote from said bulb, said light-absorbing material reducing the intensity of externally incident light passing therethrough said colored filter element and thereby causing the color of said colored filter element visible externally of said light-absorbing material to be subdued.

4,042,819

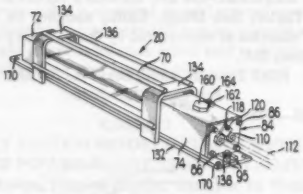
FLUORESCENT LAMP FOR USE IN EXPLOSIVE ATMOSPHERES SUCH AS MINES

Perfecto Dacal, Beckley, W. Va., assignor to Control Products Inc., Beckley, W. Va.

Filed July 9, 1976, Ser. No. 704,061

Int. Cl.[2] H05B *33/02*

U.S. Cl. 240—51.11 R **8 Claims**



1. A lamp permissible for use in explosive atmospheres such as mines comprising:

a lighting assembly and inner and outer guard assemblies therefor;

said lighting assembly including an elongated bulb with starter and ballast members removably connected to opposite ends thereof, and grounding means interconnecting said starter and ballast members;

said inner guard assembly including a transparent cylindrical housing enclosing said bulb, and end housings at the ends of said cylindrical housing enclosing said starter and ballast members respectively, electrical power outlet means in one of said end housings electrically connected to said starter and ballast members, electrical power conductors

extending through a wall of said one end housing and means in said wall for sealing said conductors; and

said outer guard assembly including an elongated support plate, means for mounting said end housings on opposite ends of said support plate, a plurality of hoops fastened to said support plate at spaced intervals therealong, and a plurality of rods fastened to said hoops extending parallel to and exteriorly of said bulb housing and providing cage-like protection therefor.

4,042,820

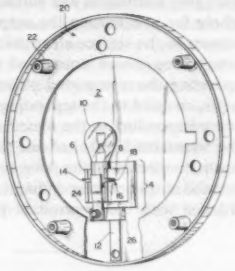
MOLDED LAMP HOUSING

Joseph E. Baader, 333 Holiday Drive, Springfield, Ohio 44505, and Edward J. Baader, 711 E. Cecil, Springfield, Ohio 45503

Filed July 1, 1976, Ser. No. 701,716

Int. Cl.[2] F21V *21/00*

U.S. Cl. 240—52 R **16 Claims**



1. A molded lamp housing operable for vehicular mounting comprising, in combination:

A. A housing base of electrically insulating material comprising a first surface having an integrally formed bulb support extending outwardly therefrom, wherein;

B. said bulb support further comprises a concave channel recess, substantially parallel to said first surface, and defined by a pair of oppositely disposed extensions, said channel being outwardly open relative to said first surface, and;

C. an outwardly open aperture extending inwardly from an outer surface on each of said pair of extensions, said apertures being oppositely disposed and operable to receive pins on a bayonet base light bulb inserted partially into said channel, and;

D. a resilient, electrically conductive ground strap comprising a cantilevered portion extending above and in substantial parallel alignment with said concave channel recess, and;

E. an electrically conductive contact strap, extending in a substantial normal fashion from said first surface, and cantilevered into said channel at a point laterally disposed with respect to said pair of apertures, whereby said bulb support is operable to urge a portion of the base of a bayonet base light bulb into contact with said cantilevered ground strap, while maintaining further electrical contact between a bottom electrical contact on said bulb and said contact strip for various rotative orientations of said so held bulb about said pins.

4,042,821

REMOTE CONTROL LIGHT RECEIVER

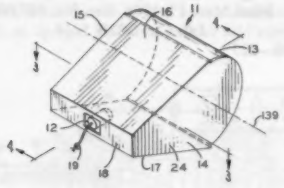
Eugene P. Mierzwinski, Fort Wayne, Ind., assignor to The Magnavox Company, Fort Wayne, Ind.

Filed Oct. 28, 1975, Ser. No. 626,165

Int. Cl.[2] H01J *3/14*

U.S. Cl. 250—216 **12 Claims**

1. A receiver for receiving light comprising a lens formed of optical material having a front light receiving surface, said front light receiving surface being cylindrical about an axis, said axis being located rearwardly of said front surface; side surfaces, said side surfaces being substantially parallel and mutually perpendicular to said axis of curvature, said side



surfaces being at least partially coated with a reflective coating; a top surface; a bottom surface; and further comprising a photodetector located within said optical material.

4,042,822

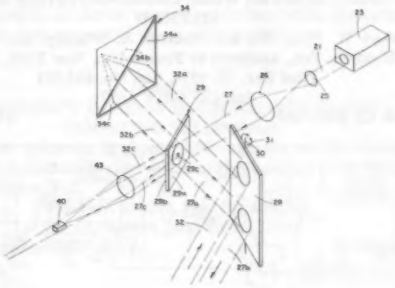
LASER RADAR DEVICE UTILIZING HETERODYNE DETECTION

Richard A. Brandewie, Laguna Beach; Walter C. Davis, Tustin, and John A. Macken, Santa Rosa, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed July 24, 1975, Ser. No. 598,957

Int. Cl.[2] H01J *3/14*; G01C *3/08, 3/36*

U.S. Cl. 250—216 **10 Claims**



1. A heterodyning light beam radar device comprising

means for emitting a light beam,

mixing mirror means having aperture means formed therein,

said light beam being directed towards said mixing mirror means, a portion of the light energy of said beam being reflected by said mixing mirror means and a portion of said energy passing through said aperture means,

scanner mirror means receiving the light energy reflected by said mixing mirror means for providing a light beam from said light energy for scanning targets to be detected, target reflections of said light energy being received by said scanner mirror means, the target reflections being reflected from the scanner mirror means and onto a portion of said mixing mirror means encompassing the aperture means,

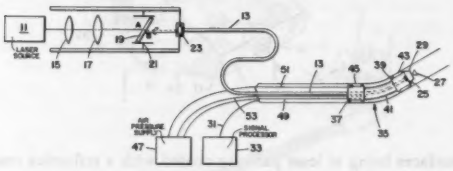
detector means for detecting the target reflections, and

means for focusing the portion of the light energy passing through the aperture means and the target reflections from the scanner mirror means onto said detector means where the light energy is detected with heterodyning action.

4,042,823
OPTICAL SCANNER

Louise A. Decker, Sunnyvale, and Gary O. Langford, Palo Alto, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 17, 1976, Ser. No. 667,806
Int. Cl.² G02B 5/14
U.S. Cl. 250—227 8 Claims

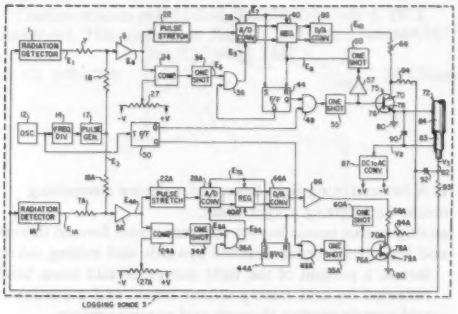


1. A scanner which comprises:
a. a laser beam source;
b. a relay lens to adjust the diameter of a beam emergent from said source to a predetermined dimension;
c. an inclined plate of transparent material, said plate located in the path of said beam to cause an emerging beam to be shifted a predetermined amount in a direction parallel to said beam;
d. rotation means to cause said plate to rotate about the point at which said beam impinges upon said plate;
e. optical transfer means located beyond said inclined plate to intercept and transmit said emerging beam; and
f. a reflecting cone located beyond said optical transfer means to deflect a beam emerging from said optical transfer means to the surrounding environment.

4,042,824
DUAL SPECTRA WELL LOGGING SYSTEM AND METHOD

Robert W. Pitts, Jr., and Houston A. Whatley, Jr., both of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 22, 1975, Ser. No. 643,261
Int. Cl.² G01V 5/00
U.S. Cl. 250—263 15 Claims

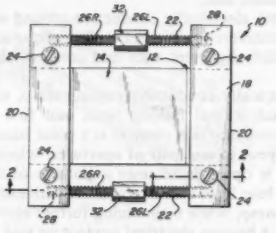


1. A nuclear well logging system for providing outputs corresponding to at least one condition relative to an earth formation sensed in a borehole, comprising a logging instrument adapted to be passed through a borehole, said instrument including at least two detecting means being responsive to penetration radiation corresponding to the condition in the borehole for providing data pulses corresponding in number and peak amplitude to the detected penetration radiation, at least one reference pulse means for providing reference pulses and two pulse signal means, each pulse signal means being connected to a corresponding detecting means and receiving a reference pulse for providing a pulse signal having reference pulses and data pulses, and pulse output means connected to all the pulse signal means for periodically sampling the pulse signals from each pulse signal means and providing output pulses corresponding in amplitude and polarity to the sample in a manner so that output pulses of one polarity are provided during first predetermined time intervals and output pulses of another polarity are provided during second predetermined time intervals, said pulse output means including two network means, each network means including means connected to corresponding pulse signal means for stretching the pulses in the pulse signal from the pulse signal means, sampling means connected to the pulse stretching means for periodically sampling the stretched pulses and providing an output voltage corresponding to the first stretched pulse occurring during each sampling; and circuit means connected to each sampling means for providing the output pulses of the one polarity in accordance with the output voltage from one sampling means and for providing the output pulses of the other polarity in accordance with the output voltage from the other sampling means; conductive means connected between said output pulse means in the logging instrument and surface electronics adjacent the borehole for transmitting the output pulses from the logging instrument to the surface electronics, and said surface electronics comprising means connected to the conductive means for separating the transmitted pulses by polarity, first processing means coupled to the separating means for providing an output corresponding to the sensed condition in accordance with the transmitted pulses of one polarity, and second processing means connected to the pulse separating means for providing a second output corresponding to the sensed condition in accordance with the transmitted pulses of the other polarity.

4,042,825
STRESSED-UNSTRESSED STANDARD FOR X-RAY STRESS ANALYSIS AND METHOD OF MAKING SAME

Clayton O. Ruud, Englewood, Colo., assignor to Colorado Seminary, Denver, Colo.

Filed July 9, 1976, Ser. No. 703,845
Int. Cl.² G01N 23/20
U.S. Cl. 250—272 6 Claims



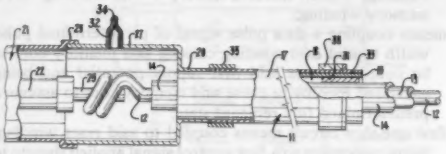
1. Apparatus for use with a position-sensitive X-ray detection device in the determination of the sample to detector distance and the angle between the surface normal and the incident X-ray beam preparatory to analyzing the stresses within an unknown sample which comprises: a sheet of stressable material; a film of strain-free material coated upon the stressable sheet; means detachably fastened to the stressable sheet in opposed spaced relation to one another; and means interposed between said opposed means operative upon actuation to change the spacing therebetween and place the stressable sheet under stress without stressing the strain-free film coated thereon.

4,042,826

ELECTRICAL CABLE

Harold A. Thomas, San Diego, Calif., assignor to General Atomic Company, San Diego, Calif.

Filed June 19, 1975, Ser. No. 588,232
Int. Cl.[2] G01J 1/00
U.S. Cl. 250—336 4 Claims



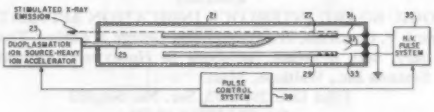
1. An electrical cable comprising, a flexible inner conductor, at least one flexible layer of radiation resistant organic insulation surrounding said inner conductor in contact therewith and coextensive therewith, a metal sleeve coextensive with said inner conductor and said insulation layer and having an inner diameter which is sufficiently greater than the outer diameter of said insulation layer or layers as to leave a substantial space between said insulation layer or layers and said sleeve with maximum thermal expansion of said insulation layer or layers, said metal sleeve being of an electrically conductive material and a thickness such that it is manually bendable, said sleeve being sealed at both ends, and said space being filled with a non-reacting gas.

4,042,827

STIMULATED EMISSION X-RAY GENERATOR

Richard A. McCorkle, South Salem, N.Y., and James M. Joyce, Greenville, N.C., assignors to Research Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 402,900, Oct. 3, 1973, abandoned. This application May 29, 1975, Ser. No. 581,945
Int. Cl.[2] G21G 4/00
U.S. Cl. 250—493 6 Claims



1. An X-ray wavelength generator comprising:

a volume of material capable of a high energy density interaction to produce particles capable of emitting radiation at X-ray wavelength; and

means for causing a swept high energy density interaction in a continuous path along said material traveling at approximately the speed of light to cause excited particles to be present in a region in convergence with said material;

thereby producing in the region a medium for non-isotropic X-ray generation through said region.

4,042,828

RACK FOR NUCLEAR FUEL ELEMENTS

Herbert J. Rubinstein, Los Gatos; Clark B. Gordon, San Jose; Albert Robison, Los Gatos, and Philip M. Clark, San Jose, all of Calif., assignors to Nuclear Services Corporation, Campbell, Calif.

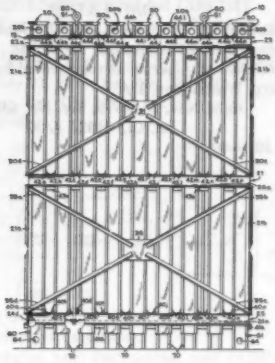
Filed Nov. 17, 1975, Ser. No. 632,387
Int. Cl.[2] G21F 5/00
U.S. Cl. 250—507 16 Claims

8. A rack for spent nuclear fuel elements comprising:

a. a frame;

b. enclosures for containing respectively spent nuclear fuel elements, said enclosures being supported by said frame in an upright position; and

c. a support for each of said enclosures resting on a supporting surface and disposed below the fuel element contained by the associated enclosure for supporting the load of the fuel element while the associated enclosure retains the fuel element in an upright position, each of said supports comprising:



a. a first base on which rests an associated fuel element; and

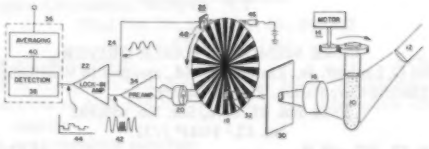
b. swivel means connected to its associated first base and disposed on a supporting surface to support the associated first base for self-aligning movement to accommodate an uneven supporting surface while supporting the fuel element in the upright position.

4,042,829

FREQUENCY DOMAIN DISCRIMINATION AND COUNTING TECHNIQUE

E. Ronald Atkinson, Bethesda, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 4, 1975, Ser. No. 628,706
Int. Cl.[2] G06M 7/00; G02B 27/38
U.S. Cl. 250—550 11 Claims



1. A system for counting the number of objects in a selected sample by automatic measurement of spatial frequency components in the system's field-of-view comprising;

a sample of interest that includes therein an undetermined number of objects to be counted by the system;

means for interrogating said sample and providing an electrical output responsive to the spatial frequency components in said field of view wherein said spatial frequency components are definitive of said number of objects;

said interrogating means including a light source for illuminating said sample;

a movable reticle means having alternating opaque and transmissive portions positioned in the optical path between said light source and said photodetector means;

drive means coupled to said movable reticle to cause said

alternate opaque and transmissive portions to pass between said light source and photodetector means at a predetermined frequency;

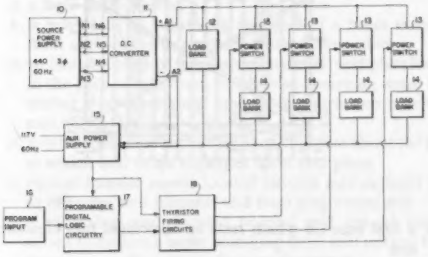
the width of said alternate opaque and transmissive portions on said reticle being chosen to provide a predetermined ratio of object size to the width of said alternating opaque and transmissive portions.

4,042,830

SOLID STATE PROGRAMMABLE DYNAMIC LOAD SIMULATOR

Carl W. Kellenbenz, Baltimore; James P. Goodman, and Randall C. Rector, both of Annapolis, all of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 25, 1975, Ser. No. 635,021
Int. Cl.[2] H02J *4/00*
U.S. Cl. 307—40 **13 Claims**



1. A dynamic load simulator for providing simulated dynamic loads to power sources comprising:

input means for receiving input power from a power source and for providing a voltage output;

means, coupled to receive said voltage output for providing a variable load to draw current from said power source, said means comprising a plurality of resistive loads;

electronic switch means coupled to each of said resistive loads and operable when energized to cause selected ones of said resistive loads to draw current;

logic means coupled to said switch means for energizing said switch means in response to program signals; and

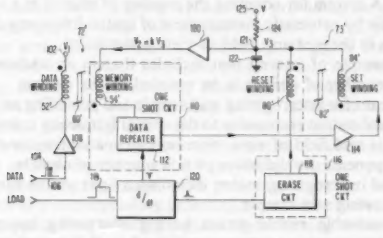
program means coupled to said logic means for providing program signals to said logic means at selected intervals to energize said electronic switch means and produce a dynamic load on the power source.

4,042,831

CORE MEMORY PHASER DRIVER

John G. Lenhoff, Jr., Linthicum, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 21, 1976, Ser. No. 650,992
Int. Cl.[2] H01P *1/32*
U.S. Cl. 307—88 R **14 Claims**



1. In a circuit for controlling a latching phaser in a phased array antenna system wherein the phaser includes a set and reset winding wound on a phaser core having a relatively high permeability and square type hysteresis loop, the improvement comprising, in combination:

a first and a second supply potential;

a memory core also having a relatively high permeability and square type hysteresis loop and including a pair of windings wound thereon, namely a data winding and a memory winding;

means coupling a data pulse signal of predetermined pulse width to said data winding causing said memory core to be coupled across said first supply potential and being energized thereby to cause said memory core to assume a predetermined flux remnant state;

first one-shot circuit means coupled to said reset winding, being responsive to a first control signal applied thereto to cause said reset winding to be coupled across said second supply potential and being energized thereby to cause said phaser core to be driven to a respective reference remnant state and thereby erase any previous remnant state;

second one-shot circuit means coupled to said memory winding being responsive to a second control signal applied thereto to cause said memory winding to be coupled across a third supply potential proportional to said second supply potential, said memory winding being energized by said third supply potential to cause said memory core to assume a respective reference remnant state and thereby generate a set signal in said memory winding having a pulse width proportional to said predetermined pulse width of said data signal;

circuit means coupling said set signal to said set winding causing said set winding to be coupled across said second supply potential and being energized thereby to cause said phaser core to assume a flux remnant state adapted to provide a selected phase shift for said phaser; and

circuit means coupled to said second supply potential for providing said third supply potential, said third supply potential thereby being adapted to change in magnitude in response to any change in the magnitude of said second supply potential

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4,042,832

LOGIC BOARD INTERLOCK INDICATION APPARATUS

Frank V. Cassarino, Jr., Weston, and George J. Barlow, Tewksbury, both of Mass., assignors to Honeywell Information Systems Inc., Waltham, Mass.

Filed Dec. 29, 1975, Ser. No. 644,653
Int. Cl.[2] H02J *13/00*
U.S. Cl. 307—149 **16 Claims**

1. Apparatus comprising:

A. a first plurality of logic boards;

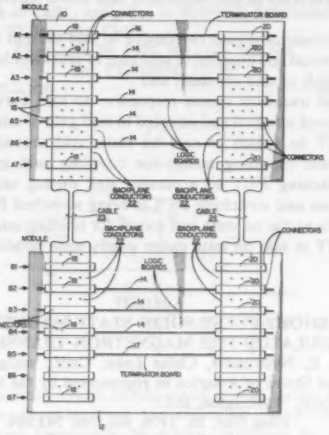
B. at least one electrical connector included for each of said logic boards, each said connector having a plurality of terminals;

C. first means for electrically coupling each of said connectors, said means for electrically coupling including means for connecting an electrical circuit through each of said logic boards in a daisy chained arrangement by means of a pair of electrically independent ones of said terminals in each of said connectors so that a continuous electrical circuit is established from a first one of said boards to a last one of said boards, said means for coupling further comprising means, included in at least one of said logic boards, for signalling whether the associated one of said logic boards is capable of operating in a satisfactory manner, said means for signalling comprising means for inhibiting a first signal state from being received at said last one of said logic boards if said associated one of said logic boards is not capable of operating in a satisfactory manner;

D. means for coupling said first signal state for receipt by one of said terminals of a one of said connectors included on a first one of said logic boards; and

E. means for indicating that said first signal state has been

received at a last one of said connectors, which said last one of said connectors is included in a last one of said logic



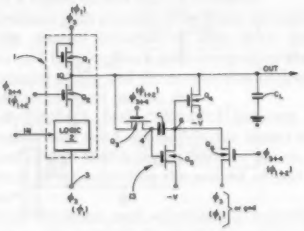
boards, whereby the proper connection of said boards with said connectors is indicated.

4,042,833

IN-BETWEEN PHASE CLAMPING CIRCUIT TO REDUCE THE EFFECTS OF POSITIVE NOISE

Mark B. Lesser, Laguna Niguel, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Aug. 25, 1976, Ser. No. 717,713
Int. Cl.[2] H03K *17/16, 19/08, 17/60, 5/08*
U.S. Cl. 307—200 B **8 Claims**



1. A circuit to reduce the effects of positive noise at the output terminal of a signal supply means, said circuit including:

source means to provide a plurality of reference potentials;

clock terminal means;

electrical junction means;

a first multi-terminal semiconductor device having conduction path terminals connected between said source means and said output terminal and a control terminal connected to said electrical junction means;

a second multi-terminal semiconductor device having conduction path terminals connected between said source means and said electrical junction means to selectively control the conductivity of said first semiconductor device; and

a third multi-terminal semiconductor device having conduction path terminals connected between said output terminal and a control terminal of said second semiconductor device to control the conductivity of said second device, and a control terminal thereof connected to said clock terminal means;

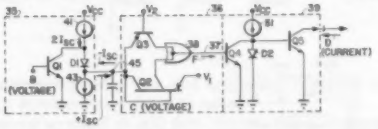
said first semiconductor device responsive to a signal at said electrical junction means to drive said output terminal to a first of said plurality of reference potentials via the conduction path of said first device during a first clock time interval when said third semiconductor device is enabled and to clamp said output terminal at said first reference potential during a second clock time interval when said third semiconductor device is disabled and said output terminal is susceptible to positive noise.

4,042,834

FREQUENCY DOUBLER CIRCUIT

W. David Pace, Tempe, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Division of Ser. No. 586,471, June 12, 1975. This application July 22, 1976, Ser. No. 707,809
Int. Cl.[2] H03B *19/14*
U.S. Cl. 307—220 R **6 Claims**



1. A frequency doubler circuit comprising:

means for providing a capacitance;

means for charging and discharging said capacitance in response to input pulses;

means for providing a first reference potential of a first predetermined magnitude and a second reference potential of a second predetermined magnitude;

ORing means;

first transistor means having main electrodes and a control electrode, said main electrodes being directly coupled between said means for providing a capacitance and said ORing means, said control electrode being adapted to receive said first reference potential; and

second transistor means having main electrodes and a control electrode, said main electrodes of said second transistor means being directly coupled between said means for providing a capacitance and said ORing means, said control electrode of said second transistor means being adapted to receive said second reference potential.

4,042,835

CHARGE COUPLED DEVICE

James T. Fulton, Stamford, Conn., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Feb. 24, 1976, Ser. No. 660,822
Int. Cl.[2] H03K *5/15*
U.S. Cl. 307—221 D **1 Claim**

1. A charge coupled semiconductor device comprising:

sources of high and low potentials and three phase clock signals:

a semiconductor substrate;

a layer of insulating material disposed on a first surface of said semiconductor substrate;

a plurality of electrodes disposed on the surface of said layer of insulating material;

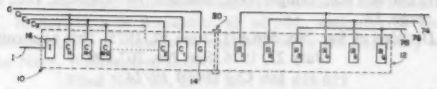
a gate electrode disposed on the surface of said layer of insulating material after said plurality of electrodes;

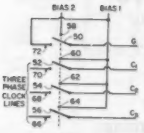
a circuit connected to said plurality of electrodes and said gate electrode including,

a first switch means for connecting together the plurality of electrodes, said first switch means having switch arms operable between contacts connected to one of the sources of high and low potentials and poles connected to the three phase clock signals such that in one position of said switch arms on the contacts a common charge is applied and in another position of the switch arms on the poles the three phase clock signals operate the plurality of

electrodes to sequentially control signals to the plurality of electrodes in progression from one of the plurality of electrodes to another toward the gate electrode and

a second switch means having a switch arm operable between a contact connected with the other source of high and low potentials and a pole connected with said one source of high and low potentials said switch arm of said second switch means being operatively linked to the first switch means switch arms to provide said other source at the gate electrode during the time said first switch means





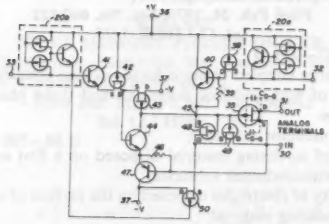
switch arms are in said one position connecting the said one source of high and low potentials to the plurality of electrodes to block transfer via said gate electrode and in said another position with said first switch means switch arms to permit transfer via said gate electrode when the switch arm of said second switch means and said first switch means switch arms are on said poles thereby connecting said one source to the gate to open same and placing the plurality of electrodes under control of the three-phase clocking signals.

4,042,836

FIELD EFFECT TRANSISTOR SWITCH

James B. Compton, Los Gatos, and Sam S. Ochi, San Jose, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Apr. 12, 1976, Ser. No. 676,096
Int. Cl.[2] H03K *17/16, 17/60, 17/72*
U.S. Cl. 307—251 **9 Claims**



1. A FET switch circuit having a switching cycle including an off state, an on state, and a transient state which exists between said off and on state, said circuit having a switching FET including a gate and a source to drain circuit, said source to drain circuit being coupled to an input terminal and an output terminal, said input and output terminals to be interconnected by said switching FET in said on state and disconnected by said FET in said off state; first and second control terminals whereby current flowing in said first terminal turns said switching FET off and current flowing in said second terminal turns said switching FET on; and a driver circuit coupled between said switching FET and said control terminals to control the off and on states of said switching FET in response to said currents in said terminals; said driver circuit comprising:

first transistor means responsive to said current in said first terminal and coupled to said gate of said switching FET to switch to said off state; and

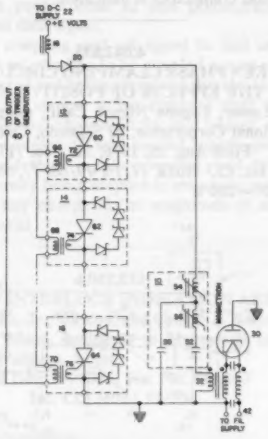
second transistor means responsive to said current in said second terminal and coupled to said gate of said switching FET to switch to said on state, said second transistor means including means for coupling said gate of said switching FET to a current sink during said transient when said switching FET is being switched from the off state to the on state and means for holding said switching FET in said on state under steady state conditions.

4,042,837

SHORT PULSE SOLID STATE-MAGNETIC MODULATOR FOR MAGNETRON TRANSMITTER

Reuben E. Nyswander, China Lake, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 15, 1976, Ser. No. 741,904
Int. Cl.[2] H03K *1/18, 3/57*
U.S. Cl. 307—265 **6 Claims**



1. A magnetic modulator for generating short pulses for a magnetron transmitter comprising:

an electrical charge source having a voltage E;

storage means coupled to said source adapted to store a charge with a resultant voltage **2E**;

said storage means having at least two conductive paths;

a storage element in each of said conductive paths adapted to be charged to a voltage **2E**;

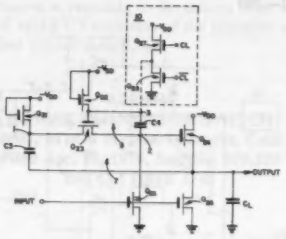
switching means coupled across said storage means including means in one of said at least two conductive paths for providing discharge path for one of said at least two storage elements so that discharge takes place in a relatively short time resulting in an overshoot whereby said one of said at least two storage elements after discharge has a voltage thereon negative in polarity to that originally thereon;

means included in the other of said at least two conductive paths for providing the resulting negative charge on said at least one storage element to be additive with the charge on the other of said at least two storage elements thereby resulting in a resultant output pulse for said magnetron transmitter having a value approximately **4E**.

4,042,838
MOS INVERTING POWER DRIVER CIRCUIT

Dana C. Street, Placentia, and Clarence W. Padgett, Westminster, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed July 28, 1976, Ser. No. 709,464
Int. Cl.[2] H03K *17/60*
U.S. Cl. 307—270 10 Claims



1. A high-speed circuit having signal source means, an input terminal, an output terminal, and utilization means connected to said output terminal to be driven therefrom by a signal substantially equivalent to that of said source means, said circuit including:

a plurality of multi-terminal semiconductor means having respective conduction path terminals and a control terminal and interconnected between said input and output terminals;

first and second capacitance means;

a first and second of said plurality of semiconductor means respectively connected between said source means and said first and second capacitance means to precharge said first and second capacitance means;

a third of said plurality of semiconductor means connected between said source means and said output terminal to supply a signal to said output terminal;

a first feedback path connected between said output terminal and the control terminal of said third semiconductor means, said first feedback path comprising the first of said capacitance means and the conduction path of a fourth of said semiconductor means; and

a second feedback path connected between the control terminal of said third semiconductor means and a control terminal of said fourth semiconductor means, said second feedback path comprising the second of said capacitance means;

said second feedback path substantially boosting the signal applied to the control electrode of said fourth semiconductor means to thereby enable said fourth semiconductor means and said first feedback path;

said first feedback path substantially boosting the signal applied to the control terminal of said third semiconductor means to enable said third semiconductor means and thereby supply said output terminal with a signal via the conduction path of said third semiconductor means to drive said utilization means, which signal is substantially equivalent to that of said source means.

4,042,839
LOW POWER DISSIPATION COMBINED ENHANCEMENT DEPLETION SWITCHING DRIVER CIRCUIT

Yoshikazu Araki, Kodaira, Japan, assignor to Hitachi, Ltd., Japan

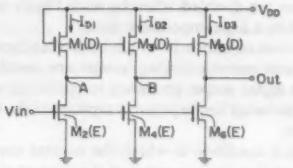
Filed Feb. 24, 1976, Ser. No. 660,777
Claims priority, application Japan, Feb. 26, 1975, 50-22933
Int. Cl.[2] H03K *19/08, 19/40, 17/04, 17/10*
U.S. Cl. 307—270 5 Claims

1. A push-pull inverter circuit comprising in combination:

first and second inverters, each including at least one depletion-type load field-effect transistor and one enhancement type driving field-effect transistor;

a third inverter having an extremely small load impedance with respect to those of said first and second inverters and including at least one depletion-type load field-effect transistor and one enhancement-type driving field-effect transistor;

input terminals of the respective inverters being connected to a common input line;



the gate and drain of the load field-effect transistor of said first inverter being short-circuited;

an output terminal of said first inverter being connected to the gate of the load field-effect transistor of said second inverter;

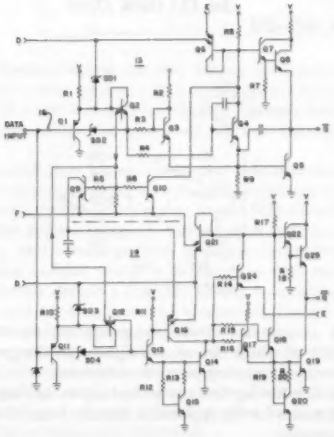
an output terminal of said second inverter being connected to the gate of the load field-effect transistor of said third inverter; and

an output terminal of said third inverter providing an output of the circuit.

4,042,840
UNIVERSAL DIFFERENTIAL LINE DRIVER INTEGRATED CIRCUIT

Louis Yc. Chan, Sunnyvale, Calif., assignor to Signetics Corporation, Sunnyvale, Calif.

Filed Sept. 2, 1975, Ser. No. 609,174
Int. Cl.[2] H03K *17/00*
U.S. Cl. 307—270 5 Claims



1. In a line driver circuit of the type having a single polarity binary signal input and having two binary signal outputs capable of selectively assuming one of four conditions, said circuit comprising:

a. first logic means responsive to said binary signal input for providing an inverted binary signal output at a first output terminal;

b. second logic means responsive to said binary signal input for providing a non-inverted binary signal output at a

second output terminal electrically isolated from said first output terminal, each of said logic means including current sourcing and sinking means at its respective output terminal; and

c. control logic means connected to said first and second logic means for selectively operating on said current sourcing and sinking means so that they assume one of the following alternative conditions:

1. a first condition in which the current sourcing and current sinking means of both said first and second logic means are disabled whereby each binary signal output exhibits a high impedance state;
2. a second condition in which both of said current sourcing and current sinking means are enabled whereby each signal output provides, respectively, non-inverted and inverted single polarity replicas of the binary signal input;
3. a third condition in which the current sourcing means of said first logic means and the current sinking means of said second logic means are enabled while the respective current sinking and current sourcing means thereof are disabled; or
4. a fourth condition which is the inverse of said third condition;

d. said third and fourth conditions resulting in an operational mode in which both binary signal outputs in combination provide a two polarity differential output.

4,042,841

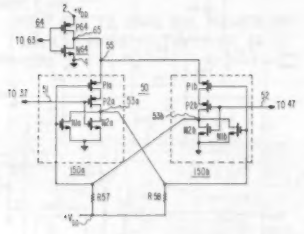
SELECTIVELY POWERED FLIP-FLOP

Vernon Elton Hills, Hightstown, and Leesui Wu, Cherry Hill, both of N.J., assignors to RCA Corporation, New York, N.Y.

Division of Ser. No. 507,780, Sept. 20, 1974, Pat. No. 4,001,613. This application Nov. 12, 1975, Ser. No. 631,328

Int. Cl.² H03K *17/00*

U.S. Cl. 307—272 **5 Claims**



1. A comparator circuit for producing an output signal indicative of which one of two signals has the greater amplitude during a sampling interval comprising:

a flip-flop having first and second inputs, an output, and two terminals for the application therebetween of an operating potential;

means for applying one of said two signals to said first input;

means for applying the other of said two signals to said second input; and

means for applying, during said sampling interval, an increasing operating potential across said two terminals for causing said flip-flop to pass through a linear range of operation, said flip-flop assuming a condition determined by the difference between said first and second signals while passing through said linear range.

4,042,842

MULTIPLE-TIME-CONSTANT INTEGRATOR OR DIFFERENTIATOR

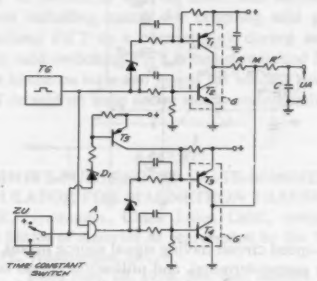
Max Hegendorfer, Forchheim, Germany, assignor to GRUNDIG E.M.V. Elektro-Mechanische Versuchsanstalt Max Grundig, Furth, Bayern, Germany

Filed Dec. 6, 1974, Ser. No. 530,343

Claims priority, application Germany, Dec. 15, 1973, 2362414

Int. Cl.² H03K *5/13, 17/60*

U.S. Cl. 307—293 **6 Claims**



1. A multiple-time-constant time-constant circuit, comprising, in combination, a first, a second and a third time-constant-determining impedance, at least one of the impedances including at least one energy-storing circuit element, the first, second and third impedances being connected in series, one end of the third impedance constituting one end of the series-connected impedances and being connected to a first reference potential; first and second signal-generating means each having an output respectively connected to one and the other end of the first impedance and operative for producing at their outputs voltages varying substantially identically between the first reference potential and a different second reference potential; the time-constant-selecting means connected to said first and second signal-generating means and operable for selecting a shorter time constant by causing both signal-generating means to operate in unison and alternatively operable for selecting a longer time constant by effectively disconnecting the second signal-generating means and causing the first signal-generating means to operate alone.

4,042,843

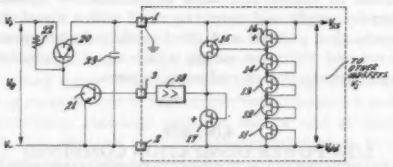
VOLTAGE LEVEL ADAPTION IN MOSFET CHIPS

Wayne Alan Sikes, Northridge, Calif., assignor to Electronic Arrays, Inc., Mountain View, Calif.

Filed June 5, 1975, Ser. No. 583,863

Int. Cl.² H03K *17/00*

U.S. Cl. 307—297 **4 Claims**



1. In an integrated circuit chip of the MOS variety and which includes a plurality of individual, active FET elements each having a particular conduction threshold defined by a particular threshold voltage and each needing a bias voltage for operation, the chip including a pair of busses to which particular potentials applied from external sources, the operating voltage for these FET elements being taken from these busses, the improvement of a plurality of FET elements having

their drain-to-gate capacitances effectively connected serially between said busses;

first circuit means included in the chip and connected to monitor whether the voltage on said busses is sufficient to place all of the FET elements of the plurality to the verge of conduction; and

second circuit means external to the chip and connected to the first circuit means and receiving the potentials as applied from said external source, to control the voltage on said busses in response to deviations from near-conduction of all said FET elements of the plurality as monitored by the first circuit means.

4,042,844

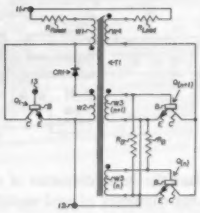
POWER TRANSISTOR SWITCH

Fred O. Barthold, 1410 B Hygeia, Leucadia, Calif. 92024

Filed Apr. 19, 1976, Ser. No. 678,239

Int. Cl.[2] H03K *3/45*

U.S. Cl. 307—314 **5 Claims**



1. A power transistor switch comprising:

a plurality of power transistors, each of said plurality of power transistors having an emitter element, a base element, and a collector element, all of said emitter elements and collector elements being connected together effecting a paralleling of collector currents; and

a transformer having a pllurality of secondary windings and at least one primary winding, each of said secondary windings being multifilar wound in the same voltage phase relationship, having substantially the same electrical characteristics and coupled directly across separate base and emitter elements of a separate one of said plurality of transistors for simultaneously providing a base drive signal of substantially the same amplitude thereto, said at least one primary winding being coupled to a switching signal.

4,042,845

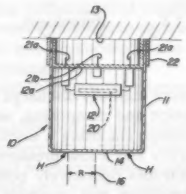
TRANSDUCER ASSEMBLY AND METHOD FOR RADIATING AND DETECTING ENERGY OVER CONTROLLED BEAM WIDTH

Kenneth R. Hackett, Boulder, Colo., assignor to Sontrix Division of Pittway Corporation, Boulder, Colo.

Filed Mar. 25, 1976, Ser. No. 670,275

Int. Cl.[2] H01L *41/04*

U.S. Cl. 310—322 **29 Claims**



1. A transducer assembly for generating and/or detecting acoustical energy at a predetermined frequency over a controlled beam width around a selected axis, said assembly comprising:

a hollow, closed cylindrical resonant chamber having planar end walls and a predetermined resonant frequency, said chamber having a longitudinal axis defined by the center axis of the cylinder which it forms, said longitudinal axis defining said selected axis and said planar end walls being disposed normal to said selected axis, one of said planar end walls having a single aperture ring formed therein through which acoustical energy can be emitted out from and into said chamber, said single aperture ring being symmetrically disposed around said selected axis at a given radial offset distance therefrom; and

transducer means mounted within said chamber for generating therein along said selected axis a spherical radiation pattern of acoustical energy at said predetermined frequency.

4,042,846

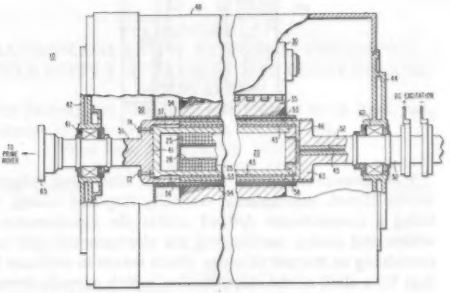
UNITARY SUPPORTING STRUCTURE FOR SUPERCONDUCTING FIELD ASSEMBLY

Charles C. Sterrett, Pittsburgh, and Cecil J. Mole, Monroeville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed July 14, 1975, Ser. No. 595,981

Int. Cl.[2] H02K *9/00*

U.S. Cl. 310—52 **5 Claims**



1. In a dynamoelectric machine having an annular stator member and a rotor having a field assembly including a core member with a superconducting winding disposed thereon, an improved arrangement for supporting said field assembly comprising:

a unitary structure for enclosing said field assembly, said unitary structure having a drive shaft portion for transmitting torque from a prime mover to said field assembly and a tubular portion integrally formed with said drive shaft portion, said tubular portion having a circumferentially extending annulus which in combination with said drive shaft portion defines a chamber having a closed end with which said drive shaft portion is integrally formed and an opened end for receiving said field assembly;

means for securing said field assembly to said unitary supporting structure within said chamber, said field assembly being enclosed within said chamber and being secured to the closed end of said tubular portion in a cantilever mounting arrangement therewith;

an end plate secured to the opened end of said tubular portion to seal said chamber;

a support shaft secured to said end plate, said support shaft cooperating with said drive shaft portion to support said unitary structure for rotational movement within said annular stator member;

a dewar vessel in the form of a generally concentric annulus having thermally insulating portions, said dewar vessel being concentrically disposed within said chamber, said field assembly being enclosed within said dewar vessel

which thermally isolates said superconducting winding from said unitary supporting structure;

an eddy current damper shield formed of conducting material concentrically disposed intermediate of said circumferentially extending tubular portion and said dewar vessel; and

a radiation shield concentrically disposed intermediate of said eddy current damper shield and said dewar vessel.

4,042,847

LIQUID-FILLED SUBMERSIBLE ELECTROMOTOR

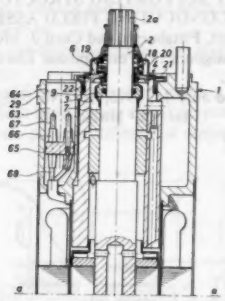
Poul Due Jensen, Wahlstedt, Holstein, Germany, assignor to Grundfos A/S, Bjerringbro, Denmark

Filed July 7, 1975, Ser. No. 593,864

Claims priority, application Germany, July 10, 1974, 2433045; July 10, 1974, 2423420; July 10, 1974, 2423431

Int. Cl.² H02K *5/12*

U.S. Cl. 310—87 **4 Claims**



1. A submersible electromotor of the kind being lodged in a totally closed, substantially vertically disposed casing, there being a compartment defined within the electromotor and within said casing, surrounding the electromotor; said casing containing an amount of water which serves to lubricate bearings for a shaft of the electromotor, which extends through a wall of said casing; the electromotor being fitted with shaft seal means in said casing wall, consisting of a stationary slide ring connected with said wall, and a rotatable slide ring connected with said shaft; said slide rings having radial sliding surfaces that abut each other and define a gap therebetween; said stationary slide ring mounted on, and connected with said casing by means of an elastic supporting member that is subjected to the pressure inside said casing, and against movable biasing means, so that said stationary slide ring is moved away from said rotatable slide ring; said supporting member being further defined by a resilient diaphragm connected at its periphery with said casing wall and also with said rotatable slide ring in such a manner as to form a passage for the water between said sliding surfaces and a surface of said diaphragm that faces away from said rotatable slide ring; the pressure in said compartment being capable of acting directly on a substantial area of said supporting member so that said compartment is effectively vented of possible over pressure as a result of air and water escaping therefrom by communication through said gap between the slide rings.

4,042,848

HYPOCYCLOIDAL PINCH DEVICE

Ja Hyun Lee, 37 E. Governer Drive, Newport News, Va. 23602

Filed May 17, 1974, Ser. No. 471,166

Int. Cl.² H05B *31/22*

U.S. Cl. 313—231.6 **6 Claims**

1. A hypocycloidal pinch device comprising

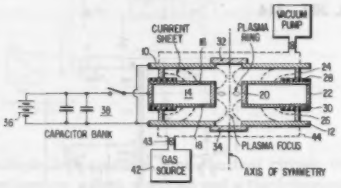
three spaced apart, coaxially aligned, annular electrodes where a middle electrode is disposed between two outer electrodes;

means for containing said spaced apart electrodes;

a first ring disposed between said middle electrode and one of said outer electrodes at the approximate outer edges thereof;

a second ring disposed between said middle electrode and the other one of said outer electrodes at the approximate outer edges thereof, said first and second rings being respectively connected to said outer electrodes;

means for insulating the first and second rings from the middle electrode, said insulating means comprising first and secnd insulative annular discs respectively disposed on the upper and lower surfaces of said middle electrode at the approximate outer edge thereof, said first and second rings respectively contacting said first and second insulative annular discs, the inner diameter of said discs



being less than the inner diameter of said rings and greater than the inner diameter of said middle electrode;

means for charging said containing means with a working gas; and

means for applying pulsed electrical energy between (a) said outer electrodes and (b) said middle electrode to thereby initially produce a first plasma of said working gas in the vicinity of the inner edge of said first annular insulative disc across said first ring and the approximate outer edge of the upper surface of said middle electrode and a second plasma of said working gas in the vicinity of the inner edge of said second annular insulative disc across said second ring and the approximate outer edge of the lower surface of said middle electrode, said first and second plasmas being radially transferred and compressed to the inner edge of said middle electrode where they are brought together along the axis of said electrodes and further compressed into a single dense plasma.

4,042,849

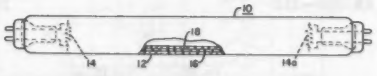
DISCHARGE LAMP WITH BLACK LIGHT TRANSMITTING FILTER LAYER

Anselm Wachtel, Pittsburgh, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 20, 1976, Ser. No. 734,070

Int. Cl.² H01J *61/40, 61/44;* G02B *5/22*

U.S. Cl. 313—489 **4 Claims**



1. A low-pressure mercury discharge device for generating black light radiation and comprising, an elongated radiation-transmitting envelope enclosing a discharge-sustaining filling comprising mercury and a low-pressure of an inert ionizable starting gas, electrodes operatively positioned proximate the ends of said envelope and operable to sustain a short-wavelength ultraviolet-generating discharge therebetween, a filter means carried as a layer on the interior surface of said envelope and substantially comprising finely divided magne-

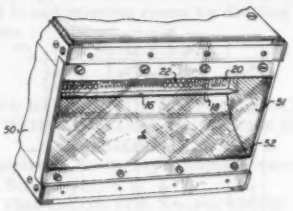
sium orthophosphate doped with a small amount of cobalt and nickel sufficient to absorb a substantial portion of any visible radiation generated within said device, and a finely divided black light generating phosphor means carried on said layer of said filter means and operable to convert said short-wavelength ultraviolet radiation generated by said discharge into black light radiation.

4,042,850

MICROWAVE GENERATED RADIATION APPARATUS

Michael Gerson Ury, Bethesda; Bernard John Eastlund, Olney; Ray S. Braden, Gaithersburg, and Charles H. Wood, Rockville, all of Md., assignors to Fusion Systems Corporation, Rockville, Md.

Filed Mar. 17, 1976, Ser. No. 667,759
Int. Cl.[2] H01J *7/46, 19/80*
U.S. Cl. 315—39 **13 Claims**



1. An apparatus for efficiently coupling microwave energy to a load which becomes highly dissipative upon absorbing microwave energy, comprising, a longitudinally extending non-resonant microwave chamber, a longitudinally extending load which becomes highly dissipative upon absorbing microwave energy disposed in said chamber in the longitudinal direction, a pair of microwave energy generating means, said chamber having a pair of coupling slots therein, said slots being parallel to each other and disposed with their long dimensions perpendicular to said longitudinal direction, and means for coupling microwave energy from each of said generating means to a respective coupling slot.

4,042,851

MAGNETRON

Yoshio Yasuoka, Hirakata; Fumihiko Ito, Otsu; Kunitada Tsuboi; Kaori Jinno, both of Daito, and Masaru Yamano, Hirakata, all of Japan, assignors to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Aug. 27, 1975, Ser. No. 608,402
Claims priority, application Japan, July 30, 1975, 50-93626
Int. Cl.[2] H01J *25/50*
U.S. Cl. 315—39.51 **11 Claims**

1. A magnetron having a substantially evacuated interior region and comprising:

an anode cylinder of magnetic material;

a plate of magnetic material at each end of the anode cylinder cooperating therewith to form a magnetic circuit and at least a portion of a vacuum container, said vacuum container enclosing said evacuated region,

permanent magnet means mounted to each of said plates and extending partially into the anode cylinder leaving a space between their opposing ends,

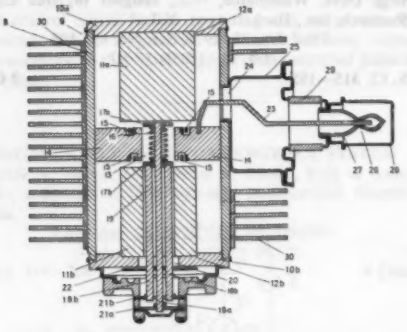
cathode means located in the space between said permanent magnet means,

anode circuit means surrounding said cathode,

an electrically conductive supporting means for holding said cathode means, said supporting means extending through a hole in one of said permanent magnets and the plate to which it is attached,

antenna means extending through a sealed hole in the wall of the anode cylinder,

heat radiator fins directly attached to the external wall of said anode cylinder, and



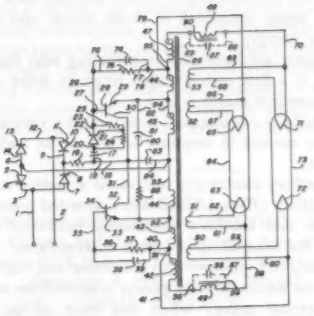
choke means disposed in said evacuated region and comprising means in proximity to one of said end plates and forming a capacitor therewith for preventing leakage of electromagnetic energy from the magnetron.

4,042,852

FLUORESCENT LAMPS WITH HIGH FREQUENCY POWER SUPPLY WITH INDUCTIVE COUPLING AND SCR STARTER

George Zaderej, and Andrew Zaderej, both of South Bend, Ind., assignors to Unitron Corporation, Elkhart, Ind.

Filed June 28, 1976, Ser. No. 700,578
Int. Cl.[2] H05B *41/04, 41/29*
U.S. Cl. 315—97 **10 Claims**



1. A high frequency power supply with inductive coupling and a SCR starter to light a fluorescent lamp, comprising:

a. a full wave rectifier;

b. a SCR starter;

c. a ferrite core autotransformer

d. an inverter consisting of two NPN transistors whose collectors are tied together and whose emitters are connected to the primary windings of the said ferrite core autotransformer;

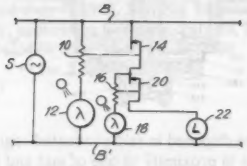
e. a fluorescent lamp connected through an inductive coupling to the output of the said high frequency power supply; and

f. the electrodes of the said fluorescent lamp connected to the secondary windings of the said ferrite core autotransformer, for heating.

4,042,853
FAIL-OFF PHOTO CONTROL CIRCUIT FOR NIGHT LIGHTING

George Duve, Washington, N.J., assignor to Area Lighting Research, Inc., Hackettstown, N.J.

Filed Jan. 28, 1976, Ser. No. 653,143
Int. Cl.[2] H05B 37/02
U.S. Cl. 315—155 9 Claims



1. A light-sensitive fail-off control circuit for a night lighting load, said circuit comprising

A. a source of electric energy;

B. a main photo sensitive element for varying flow of electrical current in response to change in ambient light intensity;

C. a main electrically motivated actuation means;

D. a main momentary off/on means responsive to said main electrically motivated actuation means for controlling electrical current flow;

E. said main photosensitive element and said main actuation means being connected in series across said source of electric energy;

F. said main actuation means actuating said main off/on means at a first ambient light intensity when said main photosensitive means is new;

G. an auxiliary photosensitive element for varying flow of electric current in response to change in ambient light intensity;

H. an auxiliary electrically motivated actuation means;

I. an auxiliary off/on latched-when-actuated means responsive to said auxiliary electrically motivated actuation means for controlling electrical current flow;

J. said auxiliary photosensitive element and said auxiliary actuation means deriving power in series from said source of electrical energy when said main off/on means is closed;

K. said auxiliary actuation means actuating said auxiliary latched-when-actuated means at a second ambient light intensity somewhat in excess of the first ambient light intensity;

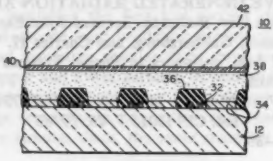
L. said night lighting load and said off/on means being series connected in circuit across said source of electric energy whereby during normal nighttime operation of the circuit said load is energized and during normal daytime operation of the circuit the load is deenergized; and

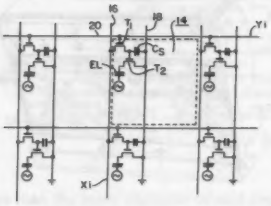
M. circuit means to connect said auxiliary latched-when-actuated means to permanently interrupt the load energizing circuit when the light intensity required to energize the main photosensitive element sufficient to close the main off/on means exceeds the second light intensity after long aging of the main photosensitive element.

4,042,854
FLAT PANEL DISPLAY DEVICE WITH INTEGRAL THIN FILM TRANSISTOR CONTROL SYSTEM

Fang-Chen Luo, Turtle Creek, and Thomas P. Brody, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 21, 1975, Ser. No. 634,216
Int. Cl.[2] H05B 33/08
U.S. Cl. 315—169 TV 4 Claims





1. An electroluminescent display panel comprising;

a. a planar substrate;

b. an array of spaced apart thin film transistor control circuitry disposed on the substrate;

c. an orthogonal matrix of rows and columns of switching signal, information signal, and power bus bars disposed on the substrate interconnecting and defining an array of unit display cells, each unit display cell including an individual thin film transistor control circuit;

d. a first electroluminescent electrode disposed on the substrate as part of each unit display cell and interconnected with the transistor control circuit;

e. a relatively thick laminated polymerized in place photoresist insulator layer disposed over the thin film transistor control circuitry and over interconnecting bus bars but not over the first electroluminescent electrodes;

f. a layer of electroluminescent material disposed over the entire area of the display panel over the insulator layer and in intimate contact with the individual first electroluminescent electrodes, which electroluminescent layer has a planar, smooth top surface;

g. a light transmissive common electrode deposited atop the electroluminescent layer and in intimate contact therewith.

4,042,855
HIGH FREQUENCY TRANSISTOR BALLAST

Charles W. Buenzli, Jr., Lancaster, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

Filed June 12, 1975, Ser. No. 586,149
Int. Cl.[2] H05B 41/29
U.S. Cl. 315—219 10 Claims

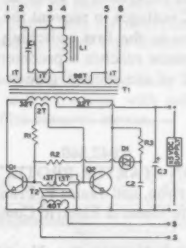
1. A power source for supplying low pressure discharge lamps comprising:

a. ballasting means connected to said lamps and to windings of a transformer,

b. a direct current source,

c. inverting means connected to said direct current source to produce high frequency alternating current including a

plurality of active devices connected to other windings of said transformer, a frequency controlling device and a low



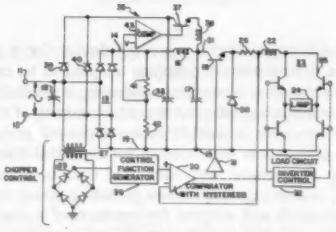
voltage energy limited remote control means magnetically coupled to said inverting means for disabling said inverting means.

4,042,856

CHOPPER BALLAST FOR GASEOUS DISCHARGE LAMPS WITH AUXILIARY CAPACITOR ENERGY STORAGE

Robert L. Steigerwald, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Oct. 28, 1975, Ser. No. 626,306
Int. Cl.[2] H05B *41/16, 41/24*
U.S. Cl. 315—246 **11 Claims**



1. A solid state ballast for gaseous discharge lamps comprising

full wave rectifying means for energization by low frequency alternating-current line voltage and supplying rectified pulsating voltage to a pair of chopper input terminals,

chopper circuit means including a main controlled switch device for controlling the operation thereof and a load circuit for supplying lamp current to a gaseous discharge lamp, said chopper circuit means being energized by a sufficiently high voltage during peak regions of the rectified pulsating voltage to maintain lamp discharge,

auxiliary capacitive energy storage means for storing energy during the peak regions and discharging said stored energy during low voltage valley regions of the rectified pulsating voltage to supply augmented voltage to said chopper circuit means and maintain lamp ionization during the valley regions, and

control means for operating said main controlled switch device at a high frequency switching rate to generate a preselected lamp current waveshape at least during the peak regions of the rectified pulsating voltage,

said auxiliary capacitive energy storage means being comprised by an auxiliary capacitor effectively connected in series with an auxiliary controlled switch device between said chopper input terminals to supply augmented chopper input voltage, means for charging said auxiliary capacitor from the alternating-current line voltage, and means for sensing the rectified pulsating voltage and rendering conductive said auxiliary controlled switch device when the rectified pulsating voltage falls below a predetermined low voltage,

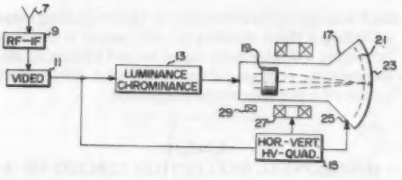
said control means further operating said main controlled switch device to generate a preselected lamp current waveshape in the valley regions of the rectified pulsating voltage.

4,042,857

CATHODE RAY TUBE CONVERGENCE SYSTEM

Frederick A. Hovey, and Charles E. Torsch, both of Geneva, N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Apr. 26, 1976, Ser. No. 680,091
Int. Cl.[2] H01J *29/70, 29/76*
U.S. Cl. 315—368 **6 Claims**



1. A cathode ray tube convergence system comprising:

a color cathode ray tube having a viewing screen and a plurality of electron beam sources, said viewing screen having corners and a horizontal axis with a center and outer ends and said electron beam sources formed to provide electron beam underconvergence interior of and convergence exterior to the center of the horizontal axis of said viewing screen; and

a deflection yoke affixed to said color cathode ray tube and including horizontal, vertical, and quadrupole windings on a core of magnetic material, said horizontal winding having a distribution selected to respond to energization to effect convergence of said electron beams from said electron beam sources at said outer ends of said horizontal axis of said viewing screen and said quadrupole windings having a distribution selected to respond to energization to effect convergence of said electron beams at said corners and said center of said horizontal axis of said viewing screen.

4,042,858

TELEVISION RECEIVER PROTECTION CIRCUIT

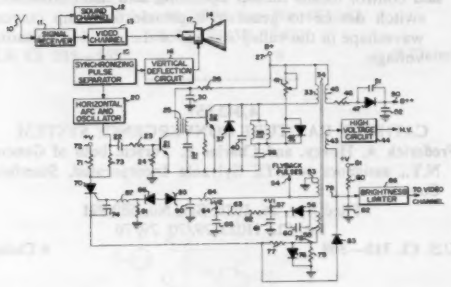
Robert P. Collette, and Robert C. Wheeler, both of Elba, N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed July 8, 1976, Ser. No. 703,613
Int. Cl.[2] H01J *29/52*
U.S. Cl. 315—379 **6 Claims**

1. In a television receiver having an image display device, a horizontal deflection winding associated therewith, a horizontal delfection circuit connected to said winding, an output transformer connected to said deflection circuit, a low voltage supply including a first winding of said output transformer, and a high voltage supply including a second winding of said output transformer, an improved protection circuit comprising a switching means connected to said horizontal deflection circuit for disabling said horizontal deflection circuit in response to fault conditions and plural sensing means including a first sensing means connected to said low voltage supply and to said switching means for providing a disablement signal to said switching means in response to current flow through said low voltage supply in excess of a predetermined magnitude wherein said improvement comprises:

a second sensing means connected to said high voltage supply and to said switching means for providing a disable-

ment signal to said switching means in response to current flow through said high voltage supply in excess of a predetermined magnitude; and



a third sensing means connected to said switching means and including a third winding of said output transformer for providing a disablement signal to said switching means in response to voltage pulses across said third winding in excess of a predetermined magnitude.

4,042,859

HORIZONTAL DEFLECTION CIRCUIT OF A TELEVISION RECEIVER WITH MEANS TO ELIMINATE GENERATION OF DANGEROUS HIGH POTENTIAL UNDER FAULTY CONDITION

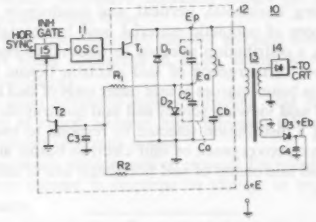
Shigeru Kashiwagi, Yokohama, Japan, assignor to Victor Company of Japan, Limited, Japan

Filed May 28, 1976, Ser. No. 690,794

Claims priority, application Japan, May 31, 1975, 50-72765

Int. Cl.² H04N *1/38*

U.S. Cl. 315—411 **5 Claims**



1. A horizontal deflection circuit for a television receiver adapted to receive television signals including a horizontal synchronization signal, the deflection circuit comprising:

a resonant circuit including a deflection coil, a first capacitor substantially tuned therewith to provide a first oscillating current during the trace interval, and series-connected second and third capacitors substantially tuned with said coil to provide a second oscillating current during the retrace interval;

a first gate-controlled switching device;

a unidirectional conducting device inversely parallel-connected to the first gate-controlled switching device;

means for applying gating-on pulses to said first gate-controlled switching device to trigger same into conduction in response to said synchronization signal to allow said first oscillating current to pass therethrough during one half of the trace period and then through said unidirectional conducting device during the other half of the trace period;

means for smoothing a voltage developed across said third capacitor of the resonant circuit to generate a first DC voltage;

means including a transformer connected to said resonant circuit to generate a second DC potential of opposite polarity to said DC voltage; and

a second gate-controlled switching device arranged to be triggered by the difference in potential between said first and second DC voltages to prevent the application of said gating-on pulses to the first switching device when said potential difference reaches a predetermined conducting threshold level of the second gate-controlled switching device.

4,042,860

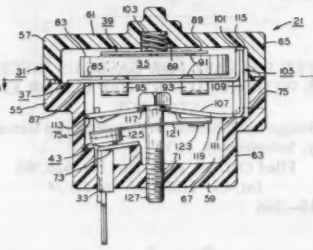
COMBINATION STARTER-PROTECTOR DEVICE

Lee O. Woods, Morrison, and James P. Frank, Rock Falls, both of Ill., assignors to General Electric Company, Fort Wayne, Ind.

Filed Oct. 21, 1975, Ser. No. 624,381

Int. Cl.² H02H *7/085*

U.S. Cl. 361—25 C **43 Claims**



1. A combination starter-protector device for a winding circuit of a dynamoelectric machine adapted to be energized from a power source comprising a housing, a solid state component in said housing adapted to control starting of the dynamoelectric machine, a pair of means mounted generally in stationary positions in said housing for electrical contact and positioning engagement with said solid state component, respectively, said engagement means including means integrally formed therewith and adapted for connection in circuit relation with the winding circuit, respectively, and circuit means electrically connected with one of said engagement means and adapted to be connected in circuit relation with the power source and including means disposed in said housing generally in spaced relation adjacent said solid state component and operable generally in response to a predetermined thermal condition occasioned upon winding circuit overload for interrupting said circuit means.

4,042,861

MOUNTING ARRANGEMENT FOR AN INTEGRATED CIRCUIT UNIT IN AN ELECTRONIC DIGITAL WATCH

Tetuya Yasuda, Tokyo; Yoshio Iinuma, Higashimurayama, and Yuzo Maeknwa, Fuchu, all of Japan, assignors to Citizen Watch Company Limited, Tokyo, Japan

Filed Nov. 6, 1974, Ser. No. 521,532

Claims priority, application Japan, Nov. 8, 1973, 48-128590; Nov. 8, 1973, 48-128591; Nov. 8, 1973, 48-129592; Apr. 1, 1974, 49-36734; Jan. 31, 1974, 49-12480

Int. Cl.² H05K *1/04*

U.S. Cl. 361—400 **3 Claims**

1. A time piece structure comprising:

a base plate including first means defining a recess thereon, said first means including second means defining a second recess within said first means;

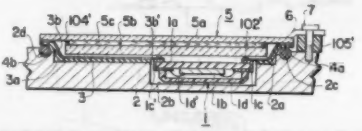
a insulated board of rectangular dimensions having upper and lower surfaces;

an I.C.-chip with a plurality of electrodes, said chip being of rectangular dimensions less than said rectangular dimen-

sions of said board and mounted on said lower surface of said board;

film element means for providing a plurality of conducting paths along said lower surface of insulated boards, along said upper surface of said board corresponding to said lower surface paths, and for interconnecting electrically said corresponding upper and lower surface conducting paths;

wire means for interconnecting each of said plurality of electrodes of said I.C.-chips with individual conducting paths of said film element means;



cover means, affixed to the lower surface of said insulated board, for completely covering said I.C.-chip and said wire means and for at least partially covering said lower film element means;

a liquid crystal display cell, mounted on said base plate over said I.C.-chip, having electrodes; and

a flexible non-conducting sheet mounted on said base plate sandwiching said insulated board into said first means with said cover means extending into said second means, said sheet including means for interconnecting said film element means with said liquid crystal display cell electrodes, said sheet bearing on said first means.

4,042,862

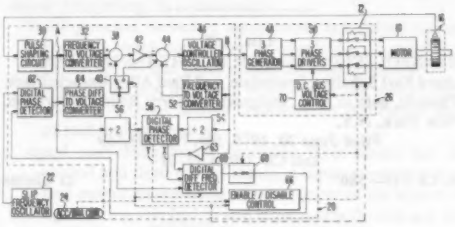
POWER CONTROL FOR VARIABLE SPEED INDUCTION MOTORS

Robert C. Franklin, 914 Bicknell Road, Los Gatos, Calif. 95030

Filed Nov. 28, 1975, Ser. No. 636,195

Int. Cl.² H02P *5/40*

U.S. Cl. 318—231 **9 Claims**



1. A closed-loop power control for a variable speed induction motor comprising:

means for providing a first pulse train having a frequency proportional to the actual rotational frequency of said motor;

means for providing a second pulse train having a frequency proportional to a desired slip of said motor;

means operative in response to an input signal from at least said first pulse train providing means for providing a third pulse train output signal to control said motor speed;

means operative to compare the phase of said first pulse train with the phase of said third pulse train for providing a fourth pulse train having a frequency proportional to the actual slip of said motor;

means operative to compare the phase of said fourth pulse train with the phase of said second pulse train for generating a correction signal proportional to the difference frequency therebetween; and

means operative to combine said correction signal and an input signal from at least said first pulse train providing means in a close phase-locking loop for maintaining said third pulse train output signal in proportion to the algebraic sum of said actual motor rotational velocity and said desired motor slip.

4,042,863

INCREMENTALLY CONTROLLABLE MOTOR DRIVE SYSTEM

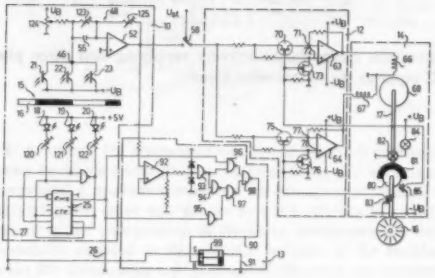
Johann von der Heide, St. Georgen, Germany, assignor to Papst-Motoren KG, St. Georgen, Germany

Filed Oct. 9, 1975, Ser. No. 620,912

Claims priority, application Switzerland, Oct. 10, 1974, 13537/74; Feb. 11, 1975, 1655/75

Int. Cl.² G05B *1/06*

U.S. Cl. 318—254 **47 Claims**



1. System for controlling a motor to execute steps each having a preselected step length, comprising, in combination, displacement transducer means coupled to said motor for furnishing a displacement signal having a constant first predetermined value during motor movement by a predetermined fraction of said step length and changing to a second predetermined value during motor movement by the remainder of said step length; proportional circuit means connected to said displacement transducer means, for furnishing a proportional signal having an amplitude proportional to the amplitude of said displacement signal; differentiating circuit means connected to said displacement transducer means for differentiating said displacement signal and furnishing a differential signal corresponding to the so-differentiated displacement signal; control signal furnishing means connected to said proportional circuit means and said differentiating circuit means for furnishing a control signal varying as a function of both said proportional and said differential signal; and means for applying said control signal to said motor to control the movement thereof.

4,042,864

AC-DC TRACTION DRIVE CONTROL SYSTEM

Melvin N. Norris, Franklin, Pa., assignor to Joy Manufacturing Company, Pittsburgh, Pa.

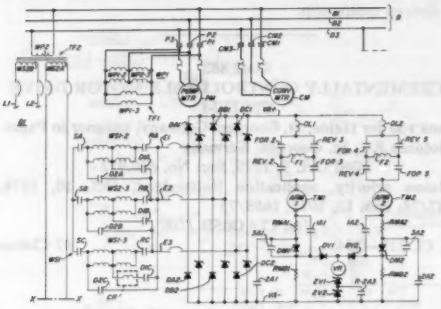
Continuation of Ser. No. 278,665, July 31, 1972, abandoned, which is a continuation of Ser. No. 16,309, Mar. 4, 1970, abandoned. This application June 9, 1975, Ser. No. 585,210

Int. Cl.² H02D *7/00*

U.S. Cl. 318—301 **18 Claims**

1. A mobile machine comprising, a machine body, a plurality of surface engaging means carried by said body and relatively movable with respect thereto and continuously engaging the ground, at least one DC traction motor carried by said body and cooperable with at least some of said surface engaging means to cause movement thereof, steering means carried by said body for selectively controlling said surface engaging means to move said machine body in a selected path, conversion means carried by said body for converting a three phase AC input to an electrical DC output, control means carried by

said body for controllably applying said DC output to said DC traction motor, and a flexible trailing cable connected to said



conversion means for selectively supplying said three phase AC input to said conversion means.

4,042,865

SEPARATELY EXCITED D.C. MOTORS

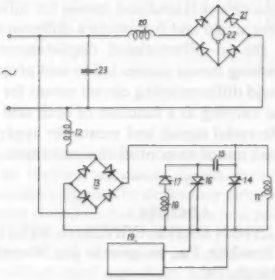
David Gurwicz, Gateshead, England, assignor to Sevcon Limited, Gateshead, England

Continuation-in-part of Ser. No. 339,181, March 8, 1973, abandoned. This application July 12, 1974, Ser. No. 488,255

Claims priority, application United Kingdom, June 21, 1974, 27708/74

Int. Cl.[2] H02P *5/16*

U.S. Cl. 318—338 **20 Claims**



1. A separately excited speed controlled D.C. motor having an armature, regulator means connected to the armature and including voltage-dropping means to permit connection of the armature with a source of supply voltage substantially greater in magnitude than the rated supply voltage of the armature and to maintain the armature current at a substantially constant level during such connection, a field winding, and controllable static switching means connected to the field winding and operable to vary the current through the field winding when the field winding is connected with the supply voltage source or other source of excitation, thereby to control the armature torque and therefore the speed in dependence on the magnitude of the current in the field winding.

4,042,866

METHOD OF PREPARING NC TAPES

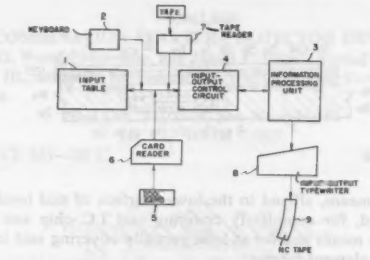
Eiichi Morita; Hisayuki Sato, and Toru Kobayashi, all of Ikeda, Japan, assignors to Daihatsu Motor Company, Limited, Osaka, Japan

Filed Sept. 17, 1975, Ser. No. 614,228

Claims priority, application Japan, Sept. 20, 1974, 49-108955; Sept. 20, 1974, 49-108956; Feb. 13, 1975, 50-18597

Int. Cl.[2] G05B *19/42*

U.S. Cl. 318—568 **3 Claims**



1. A method of preparing a NC tape for use in a NC machine tool operation, said method comprising obtaining particular machine item information, transferring such machine item information to tape means, transferring the machine item information from the tape means to an information processing unit, obtaining particular tool item information, transferring such tool item information to tape means or card means, transferring the tool item information from tape means or card means to an information processing unit, providing a particular design drawing containing machining and processing coordinates thereon, transferring the particular information on said design drawing directly to an information processing unit, processing the three types of information in the information processing unit, transferring the processed information to typewriter means and actuating said typewriter means to produce an NC tape therefrom.

4,042,867

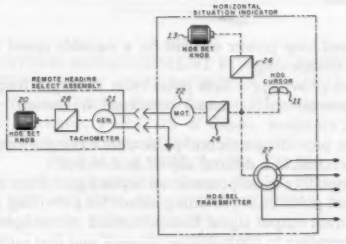
REMOTE SELECTOR FOR FLIGHT INSTRUMENTS

Richard Earl Schaffer, Scottsdale, and Paul Allen Rauschelbach, Phoenix, both of Ariz., assignors to Sperry Rand Corporation, New York, N.Y.

Filed June 30, 1975, Ser. No. 591,559

Int. Cl.[2] G05B *11/01*

U.S. Cl. 318—580 **11 Claims**



1. Apparatus for remotely adjusting display indicia of an instrument display comprising:

manually operable rotatable means disposed remotely from said instrument,

d.c. generator means coupled to said rotatable means for producing a d.c. generator signal dependent upon the speed and direction of rotation of said rotatable means,

d.c. motor means coupled to said display indicia and responsive to said d.c. generator signal for adjusting said display indicia in accordance with the rotation of said rotatable means, and

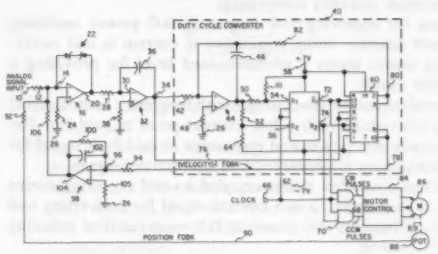
means responsive to a predetermined low value of said generator signal for providing a substantially larger signal to said d.c. motor means for overcoming the inherent breakaway voltage characteristic of said d.c. motor means.

4,042,868

STEPPER MOTOR CONTROL APPARATUS

Melvin H. Rhodes, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Sept. 22, 1975, Ser. No. 615,754
Int. Cl.[2] G05B *5/01*
U.S. Cl. 318—615 **6 Claims**



1. Apparatus for controlling a position indicating motor means comprising, in combination:

limiting means, including input means and output means;

first signal supplying means for supplying a control signal connected to said input means of limiting means;

integrating means, including input means and output means, said input means thereof connected to said output means of said limiting means;

signal converting means, including input means and first, second and third output means, a signal appearing at said first output means being representative of the square of a signal being supplied to said input means thereof and pulse signals appearing at said second and third output means being representative in frequency of the amplitude of the signal being supplied to said input means thereof and respectively representing the polarity of the signal being supplied to said input means thereof;

means connecting said output means of said integrating means to said input means of said signal converting means;

motor means including input means connected to said second and third output means of said signal converting means, said motor means being actuated a prescribed amount upon receipt of each pulse and in a direction corresponding to which of said second and third means is supplying pulse signals;

position feedback signal means connected to said motor means and supplying a signal indicative of the position of said motor means with respect to a reference; and

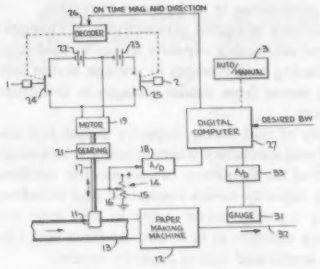
summing means for summing signals from said position feedback signal means and said first output means of signal converting means to said input means of said limiting means.

4,042,869

BACKLASH COMPENSATION

John E. Eickelberg, and James S. Rice, both of Columbus, Ohio, assignors to Industrial Nucleonics Corporation, Columbus, Ohio

Filed Mar. 29, 1971, Ser. No. 128,718
Int. Cl.[2] G05B *11/01*
U.S. Cl. 318—630 **11 Claims**



1. A system for compensating for the backlash known between backlash limits of a drive mechanism for an actuator comprising a position transducer for the actuator, means for energizing the drive mechanism in a first direction, a certain amount of the energization of the drive mechanism not being necessarily coupled to the actuator because of the backlash, means for terminating energization of the drive mechanism in the first direction in response to a change in the actuator position being sensed by the position transducer, means responsive to the position transducer for deriving an indication of the amount of movement of the actuator in response to the drive mechanism being energized, and means responsive to a change in the actuator position being sensed for energizing the drive mechanism in a direction opposite to the first direction through a distance equal to the sum of the indicated amount of actuator movement and a predetermined magnitude equal to the drive mechanism known backlash.

4,042,870

TRANSISTOR OSCILLATOR POWER CONVERTER

Jan Van Valkenburg Schaefer, 2345 Seabreeze Drive, San Diego, Calif. 92139

Continuation of Ser. No. 229,804, Feb. 28, 1972, Pat. No. 3,820,001. This application Oct. 1, 1973, Ser. No. 402,325
The portion of the term of this patent subsequent to June 25, 1991, has been disclaimed.
Int. Cl.[2] H02M *3/335*
U.S. Cl. 363—37 **19 Claims**

1. A transistor oscillator power converter for use with an electrical energy source and an electrical load and a source of potential for supplying bias current, said power converter including in combination:

a transistor having a base electrode, a collector circuit, and a base circuit,

a transformer having a ferromagnetic core, a primary winding positioned in said collector circuit, and a secondary winding positioned in said base circuit,

tuning capacity means operative to cause oscillatory electric currents in said transformer,

bypass capacitor means positioned in parallel with the electrical load,

bias current conductor means for conducting bias current to said transistor base electrode for providing bias means for causing said oscillatory electric currents in said transformer to be sustained oscillatory electric currents,

rectifier means in said base circuit for causing a first average value of rectified current to be conducted by the electrical

load and a second average value of rectified current to be conducted by said transistor base electrode,

said power converter having conductor means for connection of the electrical energy source in said collector circuit for supplying collector voltage through said primary winding to said transistor,

said collector circuit and said base circuit having interactivity for causing interaction of electric currents in said base circuit and said collector circuit for further causing electric oscillations in said power converter,

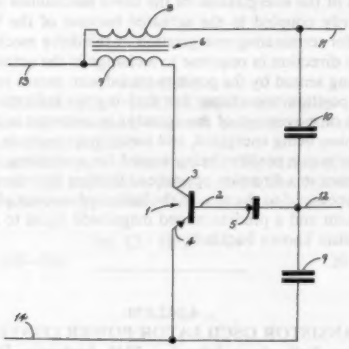
said interactivity including productivity of changes in voltage across said tuning capacity means by said transformer for producing said changes in voltage across said tuning capacity means from similar changes in transistor collector current,

the capacity of said tuning capacity means and the inductance of said secondary winding being substantially determinative of the frequency of said electric oscillations,

said tuning capacity means resonating said transformer,

said tuning capacity means being in said base circuit for producing changes in base current from said changes in voltage across said tuning capacity means,

said bypass capacitor means being in said base circuit further being subtantially preventative of appearance of said electric oscillations across the electrical load,



said power converter including conductor means for connection of the electrical load,

said bias current providing sufficient base current for said transistor to cause said electric oscillations to be sustained electric oscillations,

which sustained electric oscillations include said sustained oscillatory electric currents,

said rectifier means being operative to conduct current for only part of each cycle of said electric oscillations for causing said first average value of rectified current and said second average value of rectified current to be conducted in said power converter,

whereby said first average value of rectified current produces a voltage across the electrical load substantially different in magnitude from the voltage of the electrical energy source,

said rectifier means including rectifier means not provided by said transistor,

substantially all said second average value of rectified current conducted by said transistor base electrode being conducted by said rectifier means,

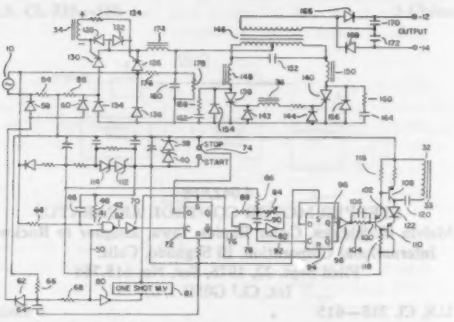
substantially all oscillatory electric currents conducted by said transistor base electrode being conducted by said rectifier means.

4,042,871

CONVERSION SYSTEM WITH OVERCURRENT PROTECTION AND START-UP CIRCUITRY

Calvin E. Grubbs, Garland, and Jack B. Harwell, Euless, both of Tex., assignors to ECC Corporation, Euless, Tex.

Filed Nov. 14, 1975, Ser. No. 631,813
Int. Cl.[2] H02H 7/122, 7/127
U.S. Cl. 363—28 **10 Claims**



1. Inverter circuitry comprising:

means for receiving low frequency AC power including fault detector means responsive to current in said receiving means above a predetermined level for providing a fault signal;

control means for generating a high frequency control signal synchronized with a low current point of said low frequency AC power and responsive to said fault signal for terminating the generation of said control signal;

full wave rectifier means coupled to said receiving means and responsive to said control signal for converting said low frequency AC power to full wave rectified pulsating DC power;

inverter circuit means coupled to said full wave rectifier means and responsive to said high frequency control signal for providing an AC signal at said high frequency from said DC power output of said full wave rectifier means;

a capacitor connected across the input to said inverter circuit means; and

means for precharging said capacitor to a preselected voltage;

said capacitor providing sufficient energy to the inverter circuit means when said high frequency control signal is initially applied to said inverter circuit means to permit commutation under steady state conditions without generation of a fault signal.

4,042,872

STATIC CONVERTER HAVING PARTIALLY GAPPED TRANSFORMER

James A. McLeod, 224 N. Red Oak Drive East, Sunnyvale, Calif. 94086

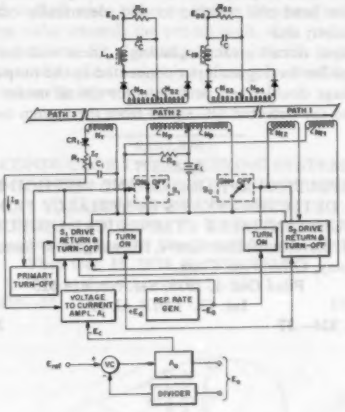
Filed Dec. 29, 1975, Ser. No. 644,444
Int. Cl.[2] H02M 3/335
U.S. Cl. 363—20 **13 Claims**

1. Static converter apparatus comprising:

transformer means including a unitary ferromagnetic core of uniform permeability having portions forming first, second and third flux paths, said portions being arranged so that the flux flowing in said first path and said third path flows through the portion of said core forming said second path, the portion of said core forming said third path having a gap for causing the reluctance of said third path to be greater than the reluctance of said first path, a primary winding wound about the portion of said core forming said second path, sense winding means wound about

the portion of said core forming said first path, and a plurality of secondary windings wound about the portion of said core forming said second path;

input circuit means including a DC power source, and switching means for alternately causing current supplied by said source to flow in opposite directions through said primary winding, said switching means being controlled



by the voltage developed across said sense winding means; and

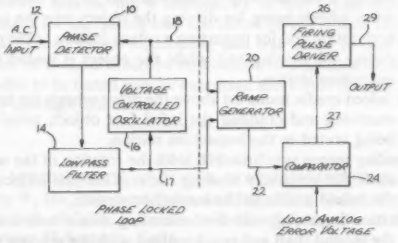
output circuit means including means for rectifying current developed in said secondary windings to provide DC outputs and filter means associated with each said secondary winding, each said filter means including a choke coil, at least some of said choke coils being wound about a common core.

4,042,873

PHASE LOCKED FIRING CIRCUIT FOR SCR'S, OR THE LIKE

Jay Ashton Cox, Rolling Hills Estates, Calif., assignor to Guldon Industries, Inc., Metuchen, N.J.

Filed Nov. 26, 1976, Ser. No. 745,085
Int. Cl.² H02M *7/00*
U.S. Cl. 363—129 **9 Claims**



1. In a rectifier means for rectifying an alternating current power signal with silicon controlled rectifiers, or the like, where said rectifiers are controlled by a firing circuit which is responsive to said power signal, an improvement comprising:

an oscillator means for providing an oscillator signal, said oscillator coupled to said firing circuit;

a phase detection means for comparing the phase of said oscillator means with the phase of said power signal, said phase detection means coupled in a closed loop with said oscillator means;

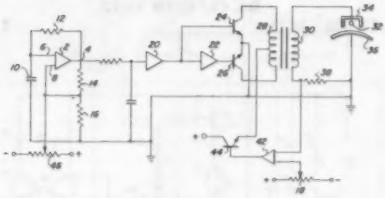
whereby an undistorted signal from said oscillator means is coupled to said firing circuit.

4,042,874

HIGH-VOLTAGE A.C. POWER SUPPLY WITH AUTOMATICALLY VARIABLE D.C. BIAS CURRENT

H. Quinn, Rancho Palos Verdes, Calif., and Nicholas M. Soures, Webster, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Sept. 26, 1975, Ser. No. 617,132
Int. Cl.² H01T *19/00;* **H02M** *7/515*
U.S. Cl. 323—4 **8 Claims**



1. An a.c. and d.c. power supply for driving a non-linear load in which current over the operating voltage range increases faster or slower than applied voltage comprising:

generating means for generating an a.c. waveshape,

a transformer for coupling said a.c. waveshape from said generating means to said load such that the sum of all instantaneous positive and negative a.c. voltages at said load will be approximately zero, and

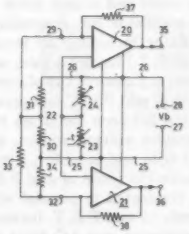
d.c. adjustment means coupled to said generating means for adjusting the symmetry of said a.c. waveshape so that the d.c. current through said load will vary under operating conditions in accordance with a predetermined plan.

4,042,875

TEMPERATURE TRANSDUCER ARRANGEMENT WHICH SUPPLIES THRESHOLD VOLTAGES WITH THE AID OF A SINGLE SENSOR

Jean-Pierre Rene Coulmance, Osny, and Jean-Claude Gerard Six, Sevres, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 22, 1975, Ser. No. 624,725
Claims priority, application France, Oct. 25, 1974, 74.35841
Int. Cl.² F24D *13/02;* **G01K** *7/20*
U.S. Cl. 323—75 N **11 Claims**



1. A temperature transducer arrangement which supplies threshold voltages by means of a single sensor comprising, a first resistor bridge including one sensor resistor having a high temperature coefficient, a voltage source, at least two high gain differential amplifiers arranged to provide on/off control of a mains-powered electrical load, means connecting two interconnected first inputs of the differential amplifiers to a common junction point of the first resistor bridge, means connecting the first resistor bridge to the terminals of the voltage

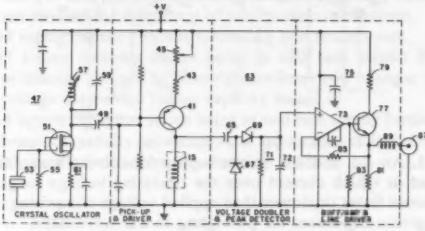
source, means connecting the second inputs of the two differential amplifiers to a second resistor bridge, one directly and the other via a voltage divider, and means connecting the second resistor bridge between the terminals of the voltage source.

4,042,876

EDDY CURRENT GAUGE FOR MONITORING DISPLACEMENT USING PRINTED CIRCUIT COIL

Armando J. Visioli, Jr., Dover, N.J., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Apr. 29, 1976, Ser. No. 681,644
Int. Cl.[2] G01R 33/12
U.S. Cl. 324—34 D **3 Claims**



1. An improved eddy current type proximity gauge for measuring the displacement of an electrically conductive member from a probe head of said gauge, and generating an output signal whose amplitude is proportional to said displacement, comprising:

a probe coil spiral wound in a single plane, said coil being disposed in said probe head for parallel displacement of the coil winding plane relative to said conductive member, said probe head being formed of a molded non-electrically conductive housing having a front portion adapted to receive said coil;

an electrically conductive back plane shield molded in the back surface of said housing parallel and adjacent to the plane of said coil but electrically insulated from said coil;

a probe head mounting tube connected to the back of said probe housing, said tube and said back plane shield having a central coaxial passageway communicating with a central passageway in said probe head housing for receiving a coaxial extension cable having a central conductor of one end connected to the central end of said spiral wound coil and a shield conductor of said one end of said cable connected to the outer end of said spiral wound coil;

a fixed frequency oscillator for generating an AC drive signal, said oscillator including an insulated gate field effect transistor (F.E.T.) having a gate, source, and drain electrodes, a frequency control cystal connected between said gate electrode of said F.E.T. and ground potential, an inductor connected between the drain electrode of said F.E.T. and a positive voltage source, a capacitor connected in parallel with said inductor, a resistor connected between said source electrode of said F.E.T. and ground and a capacitor connected in parallel with said resistor, said drain electrode of said F.E.T. forming the output of said oscillator producing said AC drive signal;

a transistor having a base emitter and collector electrodes, said collector electrode of said transistor connected to the central conductor of the extended end of said coaxial cable, said shield conductor of said extended end of said cable connected to ground;

a coupling capacitor connected between said drain electrode of said F.E.T. and said base electrode of said transistor;

biasing circuit means connected to the base electrode of said transistor for producing a linear voltage output over the coil voltage operating range;

a potentiometer connected between said emitter electrode of said transistor and said positive supply voltage source for setting the AC drive signal current supplied to said probe coil for the desired gauge sensitivity;

a cascaded voltage doubler and peak detector circuit means connected to the collector of said transistor for generating a DC signal at an output thereof which follows the peak-to-peak AC signal voltage developed across said probe coil which is proportional to the displacement of said probe head coil relative to said electrically conductive member; and

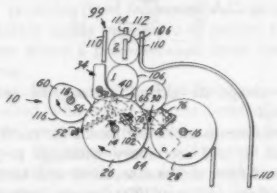
an output circuit means including a linear wideband buffer amplifier having an input connected to the output of said voltage doubler and peak detector circuit means for buffering the detected DC signal from the system output.

4,042,877

INSPECTION APPARATUS AND METHOD FOR DETECTING FLAWS IN SERIALLY FED SUBSTANTIALLY CYLINDRICAL OBJECTS

Walter J. Sieverin, Buffalo Grove, Ill., assignor to American Can Company, Greenwich, Conn.

Filed Oct. 1, 1975, Ser. No. 618,425
Int. Cl.[2] G01R 33/12
U.S. Cl. 324—37 **32 Claims**



1. An inspection apparatus for inspecting and detecting flaws in each of a plurality of serially fed substantially cylindrical objects, which comprises:

rotatable first and second shafts parallel to and spaced from each other,

a pair of drive wheels spaced from each other and freewheelingly mounted on the first shaft,

a pair of discharge wheels spaced from each other and fixedly mounted on the second shaft, the drive and discharge wheels being positioned on the respective shafts in a manner that arcs of their respective circumferences cooperate to form a notch-shaped inspection station for seating a substantially cylindrical first object therein, the drive wheels being for driving the object into the inspection station and for imparting a rotary motion to the object during the driving and while the object is seated in the inspection station,

an infeed cradle mounted above the drive wheels for initially receiving and cradling the infed first object, prior to its being seated in the inspection station,

sending means synchronized with the rotation of the second shaft, for positively sending the cradled first object from the infeed cradle to the inspection station,

rotation imparting and deaccelerating means connected to the second shaft and synchronized with the sending means for cooperating with the driving of the drive wheels for imparting a rotary motion to, while simultaneously controlledly deaccelerating the translational motion of, and easing the entry of, the positively sent first object into the inspection station,

discharge means synchronized with the rotation of the second shaft such that, with each rotation of the second shaft, the discharge means passes through the inspection station and, without use of intermittent motion mechanisms, removes a substantially cylindrical object therefrom and then discharges it from the apparatus,

means connected to the first and second shafts for rotating them at a constant speed and in time such that the first shaft rotates faster than the second,

coupling means adjustably mounted on the first shaft and communicating with the drive wheels for connecting them to the first shaft, the coupling means being adjustable to impart certain pre-set desired limited torque driving capabilities to either or both drive wheels in a manner that allows either or both drive wheels to slip with respect to the first shaft when either or both is subjected to a torque whose value exceeds the pre-set limit, and

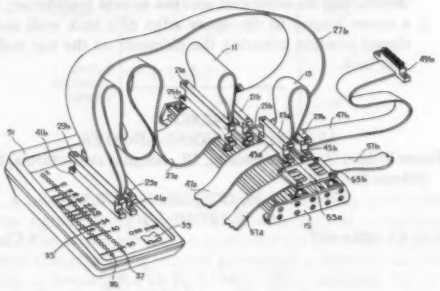
detecting means for detecting flaws in each serially fed substantially cylindrical object while it is seated and being rotated in the inspection station.

4,042,878

MULTI-CONDUCTOR CABLE TESTING SYSTEM WITH TRACK-MOUNTED SOCKETS FOR ACCOMMODATING THE CABLE CONNECTORS

Roger W. Peterson, and Arthur W. Kordes, both of Los Altos, Calif., assignors to Fasttest Company, Mountain View, Calif.

Filed Oct. 15, 1976, Ser. No. 732,583
Int. Cl.[2] G01R *31/02*
U.S. Cl. 324—51 **11 Claims**



1. A cable testing system for testing multi-conductor cables of selected width comprising,

a test fixture having mechanical stability and having a plurality of tracks therein adapted for mounting cable connectors of selected width and having at least a first pair of sockets mounted in and moveable along said tracks for mating to a test pair of connectors of a multi-conductor cable to be tested, and

a control box having a multiplicity of test lamps therein, means for energizing said test lamps on command, electrical jumper means connecting said test lamps to said first pair of sockets whereby conductors of a multi-conductor cable to be tested may be energized and tested for continuity through said lamps.

4,042,879

MICROWAVE AEROSOL WATEROMETER

William W. Ho, Thousand Oaks, and Ronald M. Govan, Camarillo, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 3, 1975, Ser. No. 628,694
Int. Cl.[2] G01R *27/04*
U.S. Cl. 324—58.5 C **11 Claims**

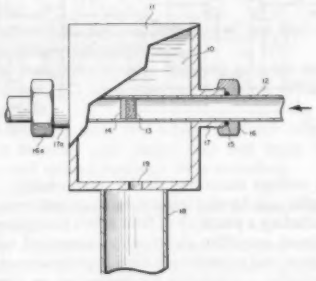
1. A method for determining the mass concentration of water in the liquid phase entrained as an aerosol in a gaseous medium, utilizing a cavity with a known resonant frequency when irradiated with microwave energy, means for generating a microwave signal adapted to irradiate said cavity, and means for determining the instantaneous resonant frequency of said cavity, comprising the steps of:

drawing said gaseous medium through said cavity at a predetermined volumetric rate;

entrapping the particulate content in said gaseous medium centrally in said cavity;

irradiating said cavity with a signal produced in said means for generating a microwave signal;

monitoring the variation with time of the instantaneous resonant frequency of the cavity, as excited by said irradiating signal and modified by the presence of said particulate;



determining the mass of said particulate fraction in a given volume of said gaseous medium;

determining the dielectric constant of the solid constituents of said particulate fraction; and

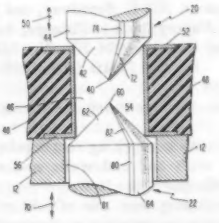
computing the mass rate of accretion of liquid water in said cavity from the monitored variation of its resonant frequency with time and the accretion rate of total particulate content within said cavity.

4,042,880

ELECTRODE ASSEMBLY FOR MEASURING THE EFFECTIVE THICKNESS OF THRU-HOLE PLATING CIRCUIT BOARD WORKPIECES

Jacques J. Weinstock, Flushing, N.Y., assignor to Unit Process Assemblies, Inc., Syosset, N.Y.

Division of Ser. No. 431,396, Jan. 7, 1974, Pat. No. 3,885,215. This application Dec. 2, 1974, Ser. No. 528,993
Int. Cl.[2] G01R *27/14*
U.S. Cl. 324—64 **1 Claim**



1. In the measurement of the conductivity of a plated coating on a thru-hole of circular cross section in a circuit board workpiece the steps of

uniformly feeding current through said plating through line electrode contact with over 80% of the circumference of the defining marginal perimetric edges of said thru-hole,

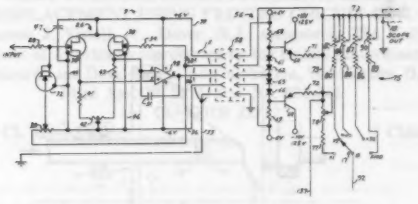
and sensing the voltage drop across said plating effected thereby through line electrode contact with the remaining portion of the circumference of the defining marginal perimetric edges of said thru-hole.

4,042,881

VOLTAGE MEASURING DEVICE HAVING AN AMPLIFIER IN THE PROBE

William Webb, Jr., Denver, Colo., assignor to Unitec, Inc., Denver, Colo.

Filed June 23, 1975, Ser. No. 589,297
Int. Cl.[2] G01R *1/30, 15/08, 1/06*
U.S. Cl. 324—123 R **6 Claims**



1. A voltage measuring device, comprising:

a probe unit having input means, output means, and means including a plurality of field effect transistors and an operational amplifier electrically connected with said input means and presenting a high impedance, said input means including a contactor for contacting an element the voltage of which is to be measured, and said output means providing an output voltage indicative of a voltage measured during contact of said contactor of said input means with said element;

conductor means connected with said output means of said probe unit; and

electrical signal processing means receiving said output voltage from said probe unit through said conductor means and providing an output suitable for use at a utilization means to indicate signal voltage measured, said electrical processing means including a pair of transistors connected in series with one another with the output of said electrical signal processing means being taken from a junction receiving the outputs from said transistors, said output from said electrical signal processing means also being fed back through said conductor means and providing an output suitable for use at a utilization means to indicate said voltage measured, said output from said electrical signal processing means also being fed back through said conductor means to said high impedance means of said probe unit.

4,042,882

RADIO-BALLOON DISTRESS SIGNAL

Gustavo G. Camacho, 308 E. Broadway, and Edward J. Shackleford, 125 E. Victory, both of Phoenix, Ariz. 85040

Filed Oct. 18, 1976, Ser. No. 733,438
Int. Cl.[2] H04B *1/04, 1/38*
U.S. Cl. 325—118 **8 Claims**

1. In apparatus for identifying the location of a person in distress:

a. a gas-tight tank comprising rectangular top and bottom walls, side walls and end walls, and a lighter than air nonflammable gas in the tank,

b. a neck protruding from one of said end walls having a conduit section communicating therewith,

c. valve in said neck held in closed position by a locking device and spring forced to open position when said locking device is rendered ineffective,

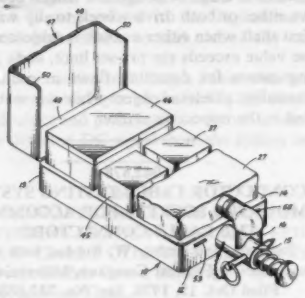
d. a balloon package comprising a collapsed balloon enclosed in a casing of metallic foil, said package being positioned on the top wall of said tank adjacent to the end wall having the neck protruding therefrom,

e. said balloon having a neck with a one way check valve therein and a conduit section extending therefrom and communicating with the conduit section on the tank neck by way of a breakable connection,

f. a radio transmitter resting on and releasably clamped to the top wall of said tank adjacent to said balloon package and includes a trigger, which activates the transmitter when it pulls free of said top wall,

g. a cable having one end secured to the neck of said balloon and its other end to said transmitter,

h. a reel secured to the top wall of said tank adjacent to said transmitter,



i. a tether taken up on said reel and having one end anchored thereto and its other end secured to said transmitter, and

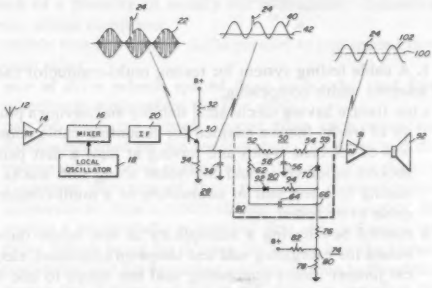
j. a cover hinged to the upper edge of a tank wall and in closed position covering the elements on the top wall of said tank.

4,042,883

AUTOMATIC NOISE LIMITER

James Wilson Rae, Schaumburg, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 25, 1976, Ser. No. 670,503
Int. Cl.[2] H04B *1/10*
U.S. Cl. 325—477 **5 Claims**



1. An automatic noise limiter circuit for use in a radio frequency receiver, the receiver producing a high frequency signal which is amplitude modulated by an audio signal, the automatic noise limiter comprising:

peak detector means for rectifying and filtering the amplitude modulated high frequency signal to recovere the audio signal therefrom and produce a direct current signal representative of the magnitude of the high frequency signal;

low pass filter means for processing the recovered audio signal and the direct current signal from the peak detector means and producing at its output a representative direct current level;

high pass filter means for passing to its output a predetermined portion of the recovered audio signal from the peak detector means, the high pass filter means preventing the peak detector means produced direct current level from passing to its output;

a noise limiter output terminal;

switch means comprising a semiconductor rectifier coupled between the output of the low pass filter and the output of the high pass filter, the rectifier exhibiting a low impedance response to the low filter output exceeding the high pass filter output by a predetermined threshold level, the rectifier otherwise exhibiting a high impedance;

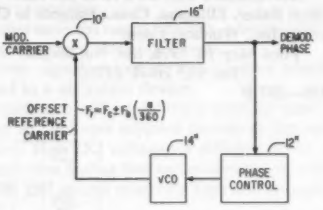
a bias means coupled to the semiconductor rectifier for producing zero bias across said rectifier in the absence of a high frequency signal from the receiver said bias means comprising temperature compensating means for maintaining said rectifier at zero bias over a temperature range in the absence of a high frequency signal from the receiver.

4,042,884

PHASE DEMODULATOR WITH OFFSET FREQUENCY REFERENCE OSCILLATOR

Lester R. Querry, Laurel, Md., assignor to Rixon, Inc., Silver Spring, Md.

Filed Feb. 20, 1975, Ser. No. 551,079
Int. Cl.[2] H03D *3/06*; H04L *27/22*
U.S. Cl. 329—122 **2 Claims**



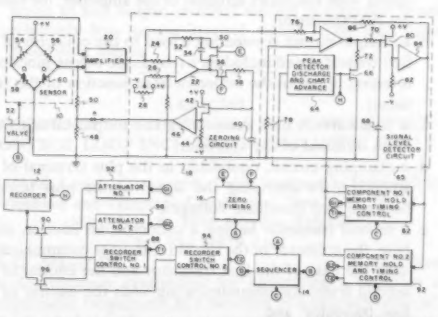
1. A method of demodulating a phase-difference modulated carrier signal having a carrier frequency Fc and a repeated phase offset increment angle α generated at a baud rate Fb, said method comprising the steps of generating a reference carrier having a frequency $Fr=Fc\pm Fb[(\alpha/360)]$, applying the received modulated carrier to one input of a mixer, and applying said reference carrier to a second input to said mixer so as to substantially cancel the repeated phase offset increment and produce a 2-level demodulated signal.

4,042,885

ZEROING CIRCUIT

Charles F. Rhodes, Jr., Richardson, Tex., assignor to Sun Oil Company, Dallas, Tex.

Division of Ser. No. 494,249, Aug. 2, 1974, Pat. No. 3,937,062.
This application Oct. 30, 1975, Ser. No. 627,329
Int. Cl.[2] H03F *1/02*
U.S. Cl. 330—9 **3 Claims**



1. An offset compensating circuit for automatically adjusting the input signal level of an electronic circuit having an input and an output to produce an output signal of a predetermined level in response to a predetermined input signal condition, said offset compensating circuit comprising:

A. an amplifier having an input and an output, said input being coupled to receive the output signal from the electronic circuit;

B. a first feedback loop, said first feedback loop being connected between said output of said amplifier and the input to the electronic circuit, said first feedback loop including:

1. a first capacitor having first and second plates;
2. first electronic switch means connected between said output of said amplifier and said first plate of said first capacitor;
3. means connecting said second plate of said first capacitor to a voltage reference; and
4. coupling means electrically disposed between said first plate of said first capacitor and the input to the electronic circuit;

C. a second feedback loop, said second feedback loop being connected between said output and said input of said amplifier, said second feedback loop including:

1. a resistor; and
2. a second electronic switch disposed in series with said resistor; and

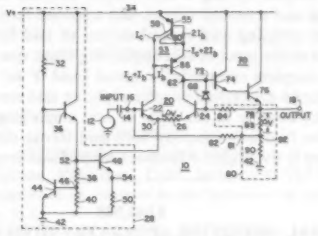
D. means for intermittently generating switching signals to switch said first and second electronic switch means to be alternatively closed in a timed relationship.

4,042,886

HIGH INPUT IMPEDANCE AMPLIFIER CIRCUIT HAVING TEMPERATURE STABLE QUIESCENT OPERATING LEVELS

John Edward Hanna, Scottsdale, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed Aug. 18, 1975, Ser. No. 605,492
Int. Cl.[2] H03F *3/45*
U.S. Cl. 330—23 **16 Claims**



1. A high input impedance amplifier having a quiescent output voltage with a predetermined temperature coefficient including in combination:

differential amplifier means including first and second electron control devices, each having a control electrode and first and second main electrodes, said differential amplifier means further having a first input terminal, a second input terminal and an output terminal;

offset voltage supply means coupled between said first main electrodes of said first and second electron control devices, said offset voltage supply means causing an offset voltage to be developed between said control electrodes of said first and second electron control devices having a selected temperature coefficient;

feedback means coupled between said control electrode of said second electron control device, said output terminal of said differential amplifier means and the output terminal of the high input impedance amplifier; and

bias means connected between said feedback means and said control electrode of said first electron control device for providing a positive feedback path for increasing the input impedance at said control electrode of said first electron control device, said bias means and said feedback means

being responsive to said offset voltage to provide the quiescent voltage having said predetermined temperature coefficient at the output terminal of the high input impedance amplifier.

4,042,887

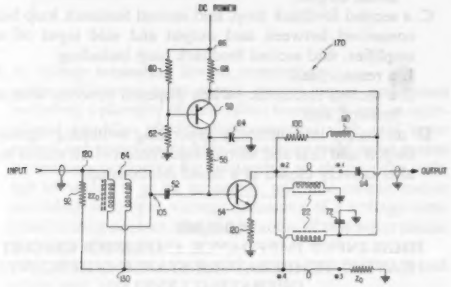
BROAD BAND AMPLIFIER

Hansel B. Mead, Melbourne, and Gary R. Callaway, Indian Harbor Beach, both of Fla., assignors to Q-Bit Corporation, Melbourne, Fla.

Continuation of Ser. No. 524,759, Nov. 18, 1974, abandoned. This application Mar. 19, 1976, Ser. No. 668,574

Int. Cl.² H03F *3/60*

U.S. Cl. 330—53 **9 Claims**



1. A broad band amplifier comprising an input terminal and an output terminal, an amplifying stage coupled between said input and output terminals, a first ferrite directional coupler coupled to the output of said amplifying stage, said first directional coupler having a first output coupled to said output terminal and a second output, and a second ferrite directional coupler coupling said second output of said first directional coupler to the input of said amplifying stage, one of said directional couplers comprising a broad band 0° to 180° coupler, said second directional coupler applying said second output of said first coupler to the input of said amplifying stage as RF negative feedback whereby both said ferrite directional couplers are in the negative feedback loop of said amplifying stage.

4,042,888

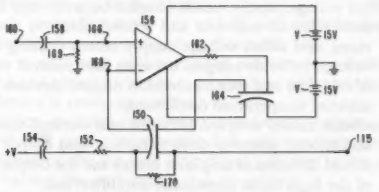
SIGNAL AMPLIFIER APPARATUS WITH FAIL-SAFE LIMITED GAIN

Arun P. Sahasrabudhe, Monroeville, and Thomas C. Matty, N. Huntingdon Township, Westmoreland County, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Feb. 26, 1976, Ser. No. 661,460

Int. Cl.² H03F *1/34*

U.S. Cl. 330—109 **6 Claims**



4. A signal amplifier apparatus having a limited gain characteristic in response to an input signal and in relation to a provided output signal, the combination comprising:

amplifier means having first and second inputs and an output, with said input signal being applied to said first input,

feedback means connected between said output and said second input and including a first four terminal capacitor, and

signal attentuation means connected between said output and said four terminal capacitor to establish a predetermined maximum level of said output signal, with said signal attenuation means including a second four terminal capacitor having a predetermined impedance characteristic for establishing said maximum level of said output signal.

4,042,889

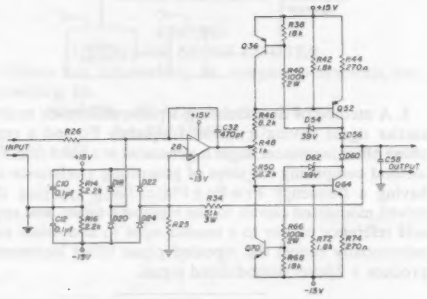
OVERVOLTAGE PROTECTION CIRCUIT FOR GENERAL PURPOSE AMPLIFIER

Roxton Elliott Baker, Ellington, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed May 14, 1976, Ser. No. 686,627

Int. Cl.² H03F *21/00*

U.S. Cl. 330—207 P **5 Claims**



1. In a buffer-amplifier circuit including an amplifier having an output terminal and a plus and a minus input terminal, an output stage following the amplifier for driving a load and protecting the amplifier comprising:

a. a transistor amplifier circuit including a first transistor having a base, a collector, an emitter, and a collector-base junction, and a bias circuit, having a first node communicating with the outlet terminal of the amplifier, for biasing the first transistor;

b. an output circuit connecting a load to the collector of the first transistor and including a first diode whose junction is oriented opposite the collector-base junction of the transistor;

c. a first current path connecting the output circuit to an input terminal of the amplifier;

d. a clamping circuit, connected to the plus terminal of the amplifier, for clamping the signal at the plus terminal between two threshold voltages;

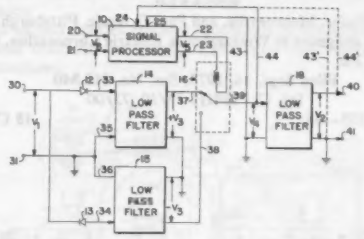
e. a second transistor having a collector, an emitter, and a base, the collector of the second transistor communicating with the base of the first transistor and the emitter of the second transistor communicating with the emitter of the first transistor; and

f. a second current path connecting the output circuit to the base of the second transistor and comprising a zener diode.

4,042,890
HIGH EFFICIENCY ELECTRICAL POWER CONDITIONER

Joseph S. Eckerle, Star Route 2, La Honda, Calif. 94020

Filed May 14, 1976, Ser. No. 686,332
Int. Cl.[2] H03F *21/00*
U.S. Cl. 330—207 A 16 Claims



1. A high efficiency power conditioner for providing power amplification of relatively low power input signals, said power conditioner comprising:

power input terminal means adapted to be coupled to an AC voltage source of electrical power;

high power signal output terminal means adapted to be coupled to a utilization device;

means coupled to said power input terminal means for converting AC voltages supplied thereto to first and second relatively high DC voltages of different levels, said converting means having first and second output terminals for said first and second relatively high DC voltages, respectively;

controllable switch means having first and second power input terminals coupled respectively to said first and second output terminals of said converting means, an output terminal coupled to said high power signal output terminal means and a control input terminal, said switch means including means responsive to signals present on said control input terminal for alternately coupling said first and second DC voltages of different levels to said output terminal thereof; and

signal processing means having a first input adapted to be coupled to a source of said relatively low power input control signals, a second input coupled to said high power signal output terminal as a feedback signal path, and an output terminal coupled to said control input terminal of said switch means, said signal processor including means for generating relatively low power control signals from said input control signals and a portion of those signals present on the feedback signal path for controlling the state of said switch means, said switch means alternately coupling said first and second DC voltages of different levels to said output terminal thereof in response to said relatively low power control signals from said signal processing means.

4,042,891
FREQUENCY SYNTHESIZER HAVING FREQUENCY CONTROL LOOP INCLUDING FIBER OPTIC DELAY LINE

Arnold M. Levine, Chatsworth, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

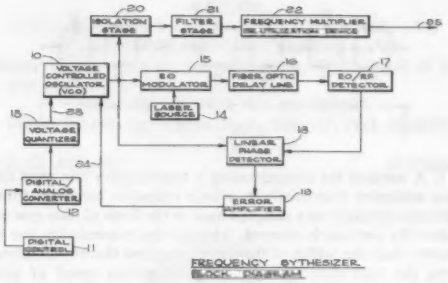
Filed July 30, 1976, Ser. No. 710,165
Int. Cl.[2] H03B *3/04*
U.S. Cl. 331—1 R 10 Claims

1. A frequency synthesizer for generating a program of discrete radio frequencies as a function of a characteristic of a control signal, said frequencies in said program each being a predetermined frequency corresponding to a predetermined condition of said control signal characteristic, comprising:

an oscillator for generating said radio frequencies, said oscillator being signal controllable;

means responsive to said control signal to control said oscillator frequency approximately to said predetermined frequency during each of said corresponding predetermined control signal conditions;

a frequency control loop including an optical delay line with a source of light energy and input electric-to-light and output light-to-electric transducers, said input transducer modulating the output of said source of light energy at



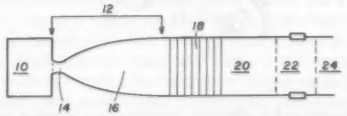
FREQUENCY SYTHESIZER BLOCK DIAGRAM

said oscillator frequency, said optical delay line having a delay time which is a function of the frequency separation between adjacent ones of said predetermined frequencies in said program, said loop also including means for comparing the period of said oscillator frequency with that of a precise frequency which is a function of a multiple of said delay time to generate and apply a second control signal to said oscillator thereby constraining said oscillator to provide an output frequency at said precise frequency with a high degree of accuracy.

4,042,892
HYPERSONIC GAS LASER

David B. Fenneman, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed July 22, 1976, Ser. No. 707,806
Int. Cl.[2] H01S *3/00*
U.S. Cl. 331—94.5 G 5 Claims



1. A hypersonic gas laser comprising:

means for heating a suitable mixture of gases to a high temperature in a pressure chamber;

a nozzle having a throat and an expansion region connected to said pressure chamber configured so that hot gases exiting said pressure chamber through said nozzle attain a hypersonic velocity;

means in an interaction region adjacent said nozzle for converting the kinetic energy of said gases flowing at said hypersonic velocity into vibrational energy; and

a lasing region adjacent said interaction region where said vibrationally energized gases emit optical radiation.

4,042,893

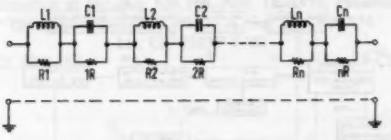
METHOD AND APPARATUS FOR IMPROVING TRANSMISSION LINE CHARACTERISTICS

Ernst Hofer, and Max Schlichte, both of Munich, Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Continuation of Ser. No. 11,681, Feb. 16, 1970, abandoned, which is a continuation of Ser. No. 562,864, July 5, 1966, abandoned. This application Apr. 10, 1972, Ser. No. 242,751

Int. Cl.[2] H03H 7/14; H04B 3/14, 3/10

U.S. Cl. 333—28 R 17 Claims



1. A method for compensating a transmission line used for time multiplex transmissions, which transmits messages from different channels on a sampled basis in the form of time spaced pulses for each such channel, wherein the transmission line is shorter than the width of the pulses supplied thereto resulting from the time duration and the propogation speed of said pulses and wherein pulses of one channel can overlap to pulses of an adjoining channel due to the influence of skin effect, comprising the step of:

reducing the frequency dependence of the impedance of said transmission line by connecting to said line at least one compensating network having an impedance which varies oppositely with frequency to the variations of the impedance of said transmission line caused by skin effect, but by the same amount.

4,042,894

MULTI-POLE CIRCUIT BREAKER SYSTEM WITH COMMON TRIP MEANS

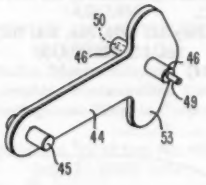
Edward Coleman, Inkpen, England, assignor to Ottermill Limited, England

Filed Aug. 15, 1975, Ser. No. 605,137

Claims priority, application United Kingdom, Sept. 20, 1974, 41035/74

Int. Cl.[2] H01H 77/00

U.S. Cl. 335—9 8 Claims



1. A device as for effecting simultaneous tripping operation of adjacently mounted circuit breakers, comprising:

a frame structure disposed between the housings of said circuit breakers;

a lever contained within said frame structure and adapted for pivotal mounting at one end to said circuit breaker housings; and

a transfer member supported at the other end of said lever and extending into the interior of said circuit breaker housings, said transfer member comprising a spigot at one end thereof and a socket at the other end thereof, said spigot and socket adapted to cooperate with corresponding spigots and sockets of transfer members of other of said devices to form spigot joints therewith;

said transfer member engaging the mechanism of said circuit breakers so that a tripping operation of one of said circuit breakers operates said transfer member to pivot said lever and operate the mechanism of said other circuit breakers to effect simultaneous tripping thereof.

4,042,895

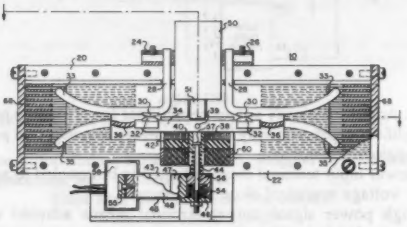
COMBINATION MOTOR-STARTER AND CIRCUIT BREAKER

John A. Wafer, Monroeville, and Paul G. Slade, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Sept. 16, 1975, Ser. No. 613,840

Int. Cl.[2] H01H 77/10, 73/00

U.S. Cl. 335—16 18 Claims



1. A mofor starter current limiting circuit breaker combination comprising:

a housing;

separable contacts disposed within said housing and supported for relative movement between a closed position completing an electrical circuit therethrough and an open position interrupting an electric circuit therethrough;

electromagnet means supported within said housing and connected to said contacts for moving said contacts to the open position or closed position; and

current tripping means supported within said housing and connected to said contacts for moving said contacts to the open position in response to an overcurrent condition above a first predetermined value, said current tripping means comprising first operating means for moving said contacts to the open position when current flow therethrough exceeds said first predetermined value, and second operating means for rapidly moving said contacts to the open position and providing current limiting when current flow therethrough exceeds a second predetermined value greater than said first predetermined value;

said electromagnet means, said first operating means, and said second operating means being connected to the same set of said contacts.

4,042,896

MANUAL AND MOTOR OPERATED CIRCUIT BREAKER

David B. Powell, Burlington; Roger N. Castonguay, Terryville, and Donald F. Aitken, Plainville, all of Conn., assignors to General Electric Company, New York, N.Y.

Filed Apr. 1, 1976, Ser. No. 672,728

Int. Cl.[2] H01H 73/12

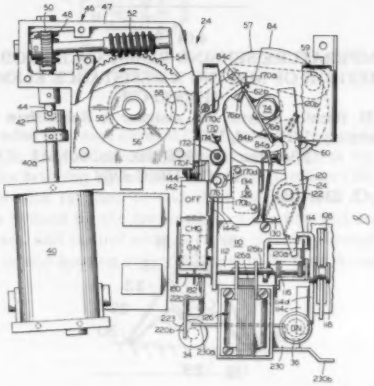
U.S. Cl. 335—17 27 Claims

1. In a circuit breaker having a spring powered operating mechanism for articulating movable contacts between open and closed circuit positions with respect to stationary contacts, apparatus for charging the breaker operating mechanism and then releasing the energy stored therein pursuant to forcibly closing the breaker contacts, said apparatus comprising, in combination:

A. an electric motor;

B. a first drive element;

C. first means drivingly connecting said motor to said first drive element;
D. a second drive element drivingly connected to the breaker operating mechanism;
E. second means selectively drivingly interconnecting said first and second drive elements to accommodate a motor-driven breaker operating mechanism charging cycle;
F. a first control element responsive to the breaker operating mechanism for sensing its charged and discharged conditions;
G. a second control element responsive to the breaker movable contacts for sensing their open and closed circuit positions;



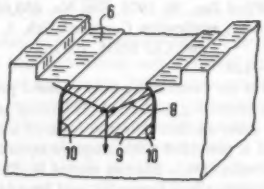
H. a third control element responsive to said second means for sensing a charging cycle in progress;
I. a closing mechanism including
1. a hook releasably latching engaging the breaker movable contacts to retain the contacts in their open circuit position during a charging cycle, and
2. means actuating said hook to release the breaker movable contacts for closure upon completion of a charging cycle; and
J. indicator means controllably positioned by said first, second and third control elements to variably display indicia identifying various breaker conditions produced by the apparatus.

4,042,897

A-C MAGNET WITH A SHORTING RING

Siegfried Seidel, Amberg, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed May 15, 1975, Ser. No. 577,872
Claims priority, application Germany, May 22, 1974, 2424983
Int. Cl.[2] H01F 7/10, 7/12
U.S. Cl. 335—245 **4 Claims**



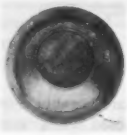
1. An a-c magnet including at least one pole comprised of laminations and having first and second slots running transversely to said laminations, each of said slots opening onto the upper surface of said pole and being defined by opposing side walls extending downwardly from said upper surface; a shorting ring having longitudinally extending first and second long sides arranged in said first and second slots; said upper surface having depressions therein extending from and running along the length of the edges of each of said first and second slots whereby said sidewalls defining said first and second slots, respectively, are caused to exert downward forces on said first and second long sides of said ring which push said ring toward the bottom of said slots.

4,042,898

POLE PIECE FOR USE IN MAGNET DEVICE AND METHOD FOR MANUFACTURING SAME

Sadami Tomita, Katsuta, and Akio Chiba, Hitachi, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Mar. 10, 1975, Ser. No. 556,887
Claims priority, application Japan, Mar. 13, 1974, 49-28071
Int. Cl.[2] H01F 3/00
U.S. Cl. 335—297 **17 Claims**



x 1/2

1. A pole piece for use in a magnet device, characterized in that the crystal structure of the surface of said pole piece is different depending on the center portion and the outer circumferential portion of said pole piece.

4,042,899

VACUUM SERVO ACTUATED VARIABLE INDUCTANCE TRANSDUCER

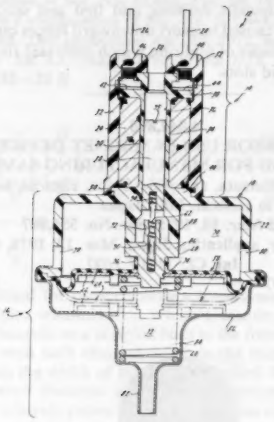
Lawrence William Tomczak, Sterling Heights; Frederick William Crall, Farmington; LaVerne Andrew Caron, Sterling Heights, and Walter Joseph Campau, Grosse Pointe Woods, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Division of Ser. No. 559,204, March 17, 1975, Pat. No. 4,024,483. This application Mar. 11, 1976, Ser. No. 665,999
Int. Cl.[2] H01F 21/02
U.S. Cl. 336—30 **8 Claims**

1. In a vacuum-servo-actuated variable inductance transducer, the combination comprising:
a one-piece molded plastic element integrally forming both a bobbin on which an inductive coil is wound and a portion of the chamber of said vacuum servo, said chamber portion terminating in a free peripheral edge portion;
a metal shell separate from said element but cooperating therewith in forming the remainder of said vacuum servo chamber, said shell having a peripheral edge portion;
a movable diaphragm having a peripheral edge portion and disposed within said vacuum servo chamber to divide same into a vacuum chamber portion adapted to be communicated to a source of vacuum and another chamber portion, said peripheral edge portion of said shell engaging said peripheral edge portion of said diaphragm and wrapping around said peripheral edge portion of said element such that said diaphragm is peripherally held between said peripheral edge portions of said element and shell, said vacuum chamber portion being defined by said diaphragm and said shell and said another chamber portion being defined by said diaphragm and said element;
a bore within said bobbin containing a core arranged for displacement therein to vary the inductance of said coil;

connection means connecting said core and diaphragm such that movement of said diaphragm causes displacement of said core within said bore;

a spring seat formed in said metal shell; and



a helical coil spring in said vacuum chamber portion having one end thereof disposed within said seat and the other end thereof biased into engagement with said diaphragm to bias same toward said another chamber portion.

4,042,900

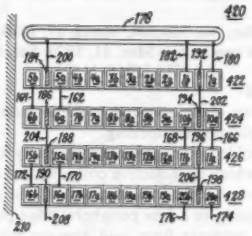
ELECTROSTATIC SHIELDING OF DISC WINDINGS

Reginald A. Hinton, Middlesbrough, England; Kenneth W. Doughty, Guelph, Canada, and William N. Kennedy, Pittsfield, Mass., assignors to General Electric Company

Continuation of Ser. No. 475,522, June 3, 1974, abandoned. This application Oct. 31, 1975, Ser. No. 627,555

Int. Cl.[2] H01F *15/04*

U.S. Cl. 336—70 **13 Claims**



1. An electrostatic shielding device for inductive apparatus of the type having,

a coil, including a plurality of generally coaxially disposed annular disc coil sections,

each of said coil sections having a plurality of single strand insulated conductor turns;

spirally wound, in the same direction, alternately radially outward and radially inward, beginning with an initial coil section at one end of said coil and terminating with a final coil section,

a finish-end of a coil section being connected to the start-end of an immediately adjacent coil section to form a coil connected in an electrical series circuit relation,

the start-end of the initial coil section being for connection to a high potential source and the finish-end of the final coil section being for connection to a low potential point,

wherein the improvement comprises:

an electrostatic shield-conductor between the two innermost turns only of coil sections of said coil,

the shield-conductor in said initial coil section being for connection to said high potential source, a shield-conductor in one coil section being electrically connected to a correspondingly positioned shield-conductor in an immediately adjacent coil section only,

said shield connections being made between the ends of adjacent coil sections having the greatest potential difference between coil section ends.

4,042,901

TEMPERATURE SENSING RESISTANCE PROBE AND METHOD OF MAKING A RESISTANCE ELEMENT THEREFOR

Jon H. Bechtel, Wayne, Pa., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Jan. 16, 1976, Ser. No. 649,612

Int. Cl.[2] H01C *3/04*

U.S. Cl. 338—28 **6 Claims**

1. A temperature sensing resistance probe comprising:

an insulating casing;

a temperature sensitive resistance element positioned within said insulating casing;

an elongated heat conductive sheaf having a continuous sidewall around the longitudinal axis thereof, said sheaf being substantially uniformly expandible along the length upon the application of an external force thereto to receive said insulating casing; and thereafter grippingly engaging said insulating casing upon the removal of said external force; and

means for connecting said temperature sensitive resistance element into an electrical circuit.

4,042,902

APPARATUS FOR CONTROLLING TWO CROSSED PROPORTIONAL ADJUSTING DEVICES BY MEANS OF A SINGLE CONTROL STICK

Hans Meyer; Werner Kaseberg; Horst Eisendick, all of Harsewinkel, and Willi Lucke, Greffen-Harsewinkel, all of Germany, assignors to Firma Simprop-Electronic Walter Claas, Harsewinkel, Germany

Filed Jan. 20, 1976, Ser. No. 650,666

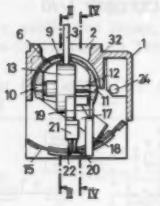
Claims priority, application Germany, Feb. 1, 1975, 2504240

Int. Cl.[2] H01C *10/16*

U.S. Cl. 338—128 **17 Claims**

1. Apparatus for controlling two crossed proportional setting devices comprising a housing (1) having an open bottom, a top whose inner surface is in the form of a cylindrical half shell (32) and is provided with a square opening (2) and two opposed sidewalls (14), a bearing means (4, 5) in each of said two opposed sidewalls, a frame (6), said frame including pivot means (7, 8) engaging said bearing means for constraining the frame to pivot about a first swivel axis, bearing and shaft means (10, 11, 12) rotating about a second swivel axis orthogonal to said first swivel axis, and coincident with the axis of the cylindrical half shell, said first and second swivel axes being parallel to the top of said housing, a first strip resistor (15) formed in a

circular sector about said first swivel axis, said first strip resistor being mounted on one of said opposed sidewalls, a second strip resistor (**20**) formed in a circular sector about said second swivel axis, said second strip resistor being mounted on said frame, a first radial extension element (**17**) extending from said pivot means (**7, 8**), a first electrical wiper contact (**18**) at the end thereof for brushing against said first strip resistor (**15**), a



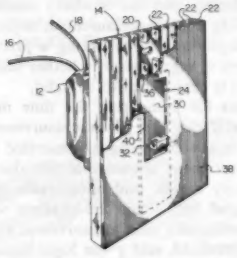
second radial extension element (**21**) extending from said shaft means (**12**), a second electrical wiper contact (**22**) at the end thereof for brushing against said second strip resistor (**20**), and a control stick (**3**) fixed to said shaft means (**12**) at a point which is defined by the intersection of the first and second swivel axes, said control stick extending upward through the opening in said housing and orthogonal to both of the swivel axes.

4,042,903

POWER CONTROL SLIDE SWITCH

John J. Finegan, Jr., Richardson, Tex., assignor to Hunt Electronics Company, Dallas, Tex.

Filed Mar. 15, 1976, Ser. No. 667,203
Int. Cl.[2] H01C *10/00*
U.S. Cl. 338—159 **4 Claims**



1. In combination with a power control device including parallel finned heat sink means and a control shaft extending through said heat sink means, said power control device including means responsive to the angular position of said control shaft for effecting a power transfer function:

gear means mounted on said control shaft;

a slidable control handle member having teeth adapted to engage said gear means and product rotation of said control shaft responsive to linear movement of said control handle member; and

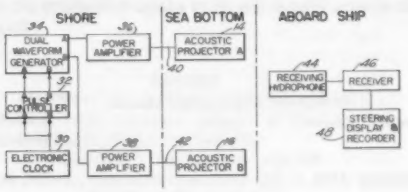
means supporting said handle member on said control device for linear movement with said teeth in engagement with said gear.

4,042,904

HYDROWAYS

A. Donn Cobb, New London, Conn., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 1, 1976, Ser. No. 719,493
Int. Cl.[2] G01S *5/18*
U.S. Cl. 340—6 R **6 Claims**



1. A marine acoustic navigation system comprising:

timing means for generating a first plurality of electrical signals of predetermined duration and spacing and for generating a second plurality of electrical signals of predetermined duration with members of said second plurality of electrical signals spaced a fixed period of time both before and after each of said first plurality of electrical signals;

first acoustic projector means connected to said timing means for converting only said first plurality if electrical signals into a first plurality of acoustic signals;

second acoustic projector means connected to said timing means for converting only said second plurality of electrical signals into a second plurality of acoustic signals;

receiving means for receiving said first and second plurality of acoustic signals and converting said first and second plurality of acoustic signals into a third plurality of electrical signals; and

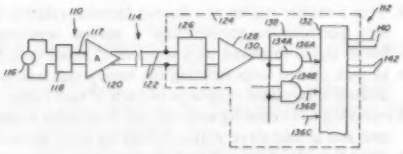
display means connected to said receiving means for receiving said third plurality of electrical signals and displaying them in time sequence.

4,042,905

DATA ACQUISITION, TRANSPORT AND STORAGE SYSTEM

J. Robert Fort; James A. Westphal, both of Altadena, and C. Hewitt Dix, Pasadena, all of Calif., assignors to Geophysical Systems Corporation, Pasadena, Calif.

Continuation-in-part of Ser. No. 358,077, May 7, 1973. This application Oct. 28, 1975, Ser. No. 626,129
Int. Cl.[2] G01V *1/22*
U.S. Cl. 340—15.5 DP **20 Claims**



1. In a seismic prospecting system in which a series of sequential elastic wave signals are impressed on the earth and detected at a plurality of spaced geophones as a plurality of separate received signals, after being transmitted through the earth, the improvement in method of acquisition, transport and storage of said signals comprising:

a. in an array terminal (AT) amplifying each of the plurality of separate received signals at constat gain to obtain a plurality of separate amplified analog signals;

b. at first selected equally spaced digitizing times simultaneously sampling each of said plurality of amplified analog

signals and producing a plurality of discrete single bit digital signals, temporarily storing said plurality of single bit digital signals in a register means; and

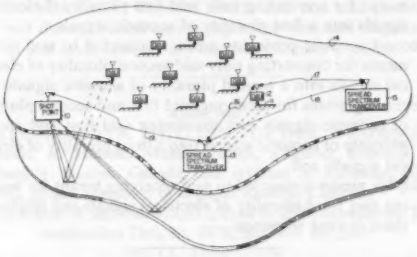
c. at second selected intervals of time, reading out in series, said temporarily stored plurality of single bit digital signals and transmitting them in series to a distant storage means over a two conductor cable means as a train of discrete single bit digital signals.

4,042,906

AUTOMATIC DATA ACQUISITION METHOD AND SYSTEM

George D. Ezell, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 29, 1973, Ser. No. 410,676
Int. Cl.[2] G01V *1/22*
U.S. Cl. 340—15.5 TS 15 Claims



1. In seismic data acquisition from a seismic prospect area, the method of:

a. establishing a slave station at a known location with respect to said area,

b. establishing data acquistion units at each of a plurality of unknown locations in said area, which units sense ground motion and convert the same to a digital representation of such motion,

c. setting a different response code into each of said units and said slave station,

d. from a master station at a known location relative to said area periodically transmitting a spread sepctrum RF freeze signal followed by a series of channel sync pulses,

e. at each of said units freezing the binary representation of motion in response to receipt of each of said freeze signal,

f. receiving and counting said channel sync pulse at each said unit and at said slave station following each freeze signal,

g. decoding the count of said channel sync pulses at each said unit and at said slave station,

h. comparing the decoded count with said response codes,

i. in response to coincidence between said decoded count and said response codes transmitting the frozen signal as spread spectrum RF pulses from each said unit followed by a like transmission of a signal from said slave station representing travel time from said master station to said unit to said slave station back to said master station, and

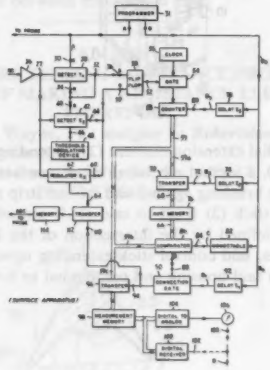
j. at said master station multiplexing the responses received from said units and said slave station to a common data channel.

4,042,907

APPARATUS FOR PREVENTING CYCLE SKIPPING IN PROCESSING ACOUSTIC WELL-LOGGING SIGNALS

Jean Claude Trouiller, Hauts de Seine, and Guy Lafont, Paris, both of France, assignors to Schlumberger Technology Corporation, New York, N.Y.

Division of Ser. No. 332,926, Feb. 16, 1973, Pat. No. 3,900,824.
This application Apr. 9, 1975, Ser. No. 566,281
Claims priority, application France, Feb. 17, 1972, 72.05300
Int. Cl.[2] G01V *1/40*
U.S. Cl. 340—15.5 BH 6 Claims



1. Acoustic well-logging apparatus comprising a probe adapted to be moved within a borehole, transducer means in the probe for transmitting and for receiving acoustic measurement waves during successive measurement sequences and for generating a composite electric signal corresponding thereto, and apparatus responsive to said composite electric signal and comprising means for generating time measurement signals representative of the transit time of said acoustic waves between given points closely spaced in the borehold during successive measurement sequences, the apparatus further comprising

auxiliary memory means,

means for introducing into the auxiliary memory means, prior to beginning a given measurement sequence, a time measurement signal generated during a preceding measurement sequence, regardless of whether said time measurement signal is determined to be valid,

comparator means for comparing the time measurement signal generated during said given measurement sequence with the time measurement signal generated during said preceding measurement, sequence as introduced into the auxiliary memory means, said comparator generating a given logic signal only when the absolute value of the difference between said time measurement signals is less than a given threshold, said given logic signal therefore indicating that the time measurement signal generated during said given measurement sequence is determined to be valid,

memory means,

means operative only in the case where said given logic signal appears for introducing into the memory means the time measurement signal generated during said given measurement sequence, said memory means otherwise remaining in its former state, and

recording means for recording the contents of said memory means as a function of the depth of the probe, each invalid time measurement signal therefore being rejected for the purpose of recording but accepted for the purpose of determining the validity of a succeeding measurement.

4,042,908

APPARATUS FOR SAFETY AND DETECTION OF ILLUMINATING CIRCUIT

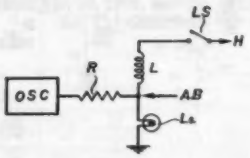
Shin Amano, Shizuoka, and Takeshi Tanga, Shimizu, both of Japan, assignors to Koito Seisakusho Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 333,843, Feb. 20, 1973, abandoned, which is a continuation of Ser. No. 258,745, June 1, 1972, abandoned, which is a continuation of Ser. No. 23,171, March 27, 1970, abandoned. This application Dec. 5, 1975, Ser. No. 638,270

Claims priority, application Japan, Mar. 28, 1969, 44-23347; June 30, 1969, 44-51349; June 30, 1969, 44-51350; Dec. 3, 1969, 44-97718

Int. Cl.[2] G08B *21/00;* B60Q *9/00*

U.S. Cl. 340—46 6 Claims



1. Monitoring apparatus for lighting circuits, comprising:
a power source for said lighting circuits;
oscillating means having an oscillating frequency output higher than the frequency of said power source;
inductor means connected in series with said lighting circuits and said power source;
said means for oscillating being non-inductively coupled to a junction of said inductor means with said lighting circuit through an impedance;
means for detecting failure of at least one of said monitored lighting circuits by detecting the presence of said oscillating frequency output at said junction, said means for detecting including means for rectifying said oscillating frequency output; and
means for indicating the presence of said oscillator output, whereby a failure of said lighting circuits is determined.

4,042,909

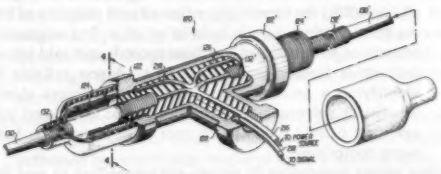
VEHICULAR DUAL TIRE OBSTRUCTION DETECTOR

Artemio R. Perez, 15771 SW. 297 St., Leisure City, Fla. 33030

Filed Oct. 6, 1975, Ser. No. 620,225

Int. Cl.[2] B60Q *9/00;* H01H *3/16*

U.S. Cl. 340—52 R 1 Claim



1. A vehicular tandem dual tire obstruction signal detector for mounting upon the chassis of a wheeled vehicle wherein said vehicle has an instrument panel and is supported by tandem dual tires, comprising:
A. electrical circuit within the vehicle, including an instrument panel signal therein; and
B. mechanical switch means in the circuit, said switch means comprising plural flexible deflector spokes secured in opposed coaxial relation to each other, each being held within corresponding flexible conductor helices, conductive nipples concentrically disposed with respect to the helices, the respective opposed helices and nipples being adapted to mounting upon the chassis of the vehicle whereby to dispose the respective spokes adjacent inner walls of the tandem duals,
C. said switch means being normally in the off position, said deflector spokes being disposed oppositely between the tandem dual tires, adjacent the walls thereof, whereby upon movement of the vehicle and lodgment of a foreign obstruction between dual tire walls, at least one said deflector spoke is intermittently deflected to close the switch via the conductive nipples to on and thereby activate the signal.

4,042,910

METHOD OF SEISMIC EXPLORATION

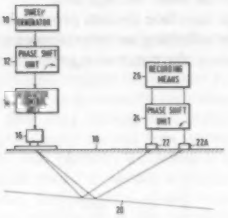
Eike Rietsch, Celle, Germany, assignor to Deutsche Texaco Aktiengesellschaft, Hamburg, Germany

Filed Oct. 9, 1975, Ser. No. 621,093

Claims priority, application Germany, Oct. 9, 1974, 2448007

Int. Cl.[2] G01V *1/14, 1/36*

U.S. Cl. 340—15.5 TA 5 Claims



1. Method of seismic exploration comprising:
generating a sweep signal of frequency changing monotonously with time
supplying said sweep signal to a transducer whose mechanical output is positioned to transmit a mechanical vibratory signal to the earth in response to receipt of said sweep signal by said transducer,
receiving said mechanical vibratory signal transmitted through the earth,
recording the received mechanical vibratory signal,
repeating the foregoing steps at least three times in sequence with the entire phase of each generated signal shifted relative to the prior signal by a fixed phase angle which is a fraction of two pi, and
transforming said recorded signals by inverting said fixed phase shifts in order to rephase the recorded series of signals prior to adding them together to produce a composite record.

4,042,911

OUTER AND ASYNCHRONOUS STORAGE EXTENSION SYSTEM

Donall Garraid Bourke, and Frederic John Puttlitz, both of Boca Raton, Fla., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 30, 1976, Ser. No. 682,223

Int. Cl.[2] G06F *13/00*

U.S. Cl. 364—900 6 Claims

1. An extendable main memory comprised of physically addressable blocks, any program and its operands being assignable to one or more address keys when the program uses logical block addressing, each key identifying an addressability assigned to the main memory, any program using up to a full range of addresses determined by the number of bits in each address within each addressability assigned in the main memory, the extendable main memory comprising
an inner storage unit being an essential part of the main memory, the inner storage unit having a size not greater

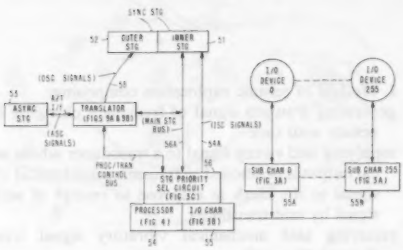
than one full range of program addresses, the inner storage unit being useable by a program which provides either logical or physical addresses as input addresses,

a translator unit for translating a logical address into a translated address to be accessed in the main memory, a logical address provided by a program being executed by a processor or by a channel, the translator containing a plurality of segmentation registers loadable with physical block addresses, any segmentation registers being selectable by a high-order part of a logical address,

a main memory bus connecting the inner storage unit to the translator unit and to a processor, the memory bus including address, data, and control lines, the memory bus communicating address keys and logical block addresses from the processor to the translator unit, translated physical block addresses from the translator to the inner storage unit, and physical addresses from the processor to the inner storage unit,

inner storage interface circuits in the translator for generating an inner storage cycle for communicating a translated address to the inner storage unit,

outer storage interface circuits provided within the translator unit for attaching an outer storage unit as a part of the main memory, the outer storage interface circuits generating an outer storage cycle for each storage access to be made in the outer storage unit,



asynchronous unit interface circuits provided within the translator unit for attaching an asynchronous storage unit as another extended part of the main memory, the asynchronous unit interface circuits generating an asynchronous storage cycle for each storage access to be made in the asynchronous storage unit, the asynchronous storage cycle having a time period which is longer than the inner storage cycle or outer storage cycle when the asynchronous storage unit is the slowest operating unit in the main memory,

a processor to translator control bus being connected at one end in the translator to the inner storage interface circuits, the outer storage interface circuits, and the asynchronous unit interface circuits, and being connected at the other end to the processor storage priority circuit,

storage unit selection circuits in the translator unit to determine the existence of an outer or asynchronous storage unit in the main memory and for activating a respective cycle for accessing each translated address in an addressed storage unit if it exists,

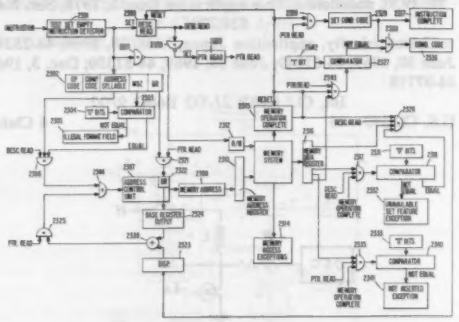
whereby the translator unit provides interfaces which provide for the attachment of either or both of the outer and asynchronous storage units.

4,042,912

DATABASE SET CONDITION TEST INSTRUCTION

Charles W. Bachman, Lexington, and Benjamin S. Franklin, Cambridge, both of Mass., assignors to Honeywell Information Systems Inc., Waltham, Mass.

Filed June 19, 1975, Ser. No. 588,436
Int. Cl.[2] G06F *9/10, 9/16, 9/20, 13/00*
U.S. Cl. 364—200 **8 Claims**



1. In an internally programmed data processing apparatus having a memory comprised of a plurality of segments of addressable space each segment having a segment number, each of said segments delineated by upper and lower variable bounds, with predetermined ones of said segments storing a plurality of files of database records grouped in sets of database records, each set having at least one owner database record, each of said database records having at least one pointer address for linking predetermined ones of said database records to predetermined others of said database records and to predetermined ones of said sets, each of said database records also being associated with one each of a record descriptor for describing said associated database record, said record descriptors being stored in predetermined sections of said segments; said data processing apparatus also having an arithmetic and logic unit (ALU) for performing arithmetic and logic operations on any data or address of said segments, database records, and descriptors, said data processing apparatus further having a system base from which absolute addresses of said segments, database records and descriptors are referenced, said data processing apparatus having a plurality of base registers, each base register for storing signals for referencing said segments;

instruction hardware responsive to a test-set instruction for determining whether or not a selected one of said database records is linked to predetermined others of said database records, said test-set instruction having a first base register address (BR) for identifying a first of said plurality of base registers storing signals indicative of a first segmented address of a first of said database records and said test-set instruction further including a first address syllable for identifying a second one of said base registers storing signals for referencing the set descriptor associated with said first of said database records, said instruction hardware comprising:

first means responsive to signals corresponding to said first address syllable identifying said second base register to convert said signals of said second base register into an absolute address for fetching the associated set descriptor of said selected one of said database records from one of said predetermined sections of said segments;

b. second means coupled to said first means and responsive to signals indicative of the displacement address in said set descriptor for generating an absolute address for fetching said pointer address of said pointers in said first of said database records;

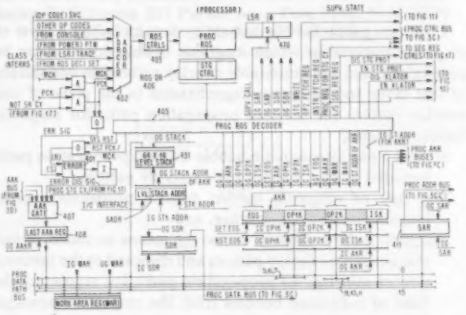
c. third means coupled to said first and second means and responsive to said first and second means for storing signals representative of said pointer address fetched from one of said segments; and

d. fourth means coupled to said third means and responsive to said signals from said third means for determining whether or not said selected one of said database records is linked to selected others of said database records.

4,042,913
ADDRESS KEY REGISTER LOAD/STORE INSTRUCTION SYSTEM

Richard Eugene Birney; Michael Ian Davis; Lynn Allan Graybiel; Robert Allen Hood, all of Boca Raton, Fla.; Samuel Kahn, Mount View, Calif., and William Steese Osborne, Boca Raton, Fla., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 30, 1976, Ser. No. 681,982
Int. Cl.[2] G06F 9/00
U.S. Cl. 364—200 **3 Claims**



1. Addressability definition control for a data processor for executing an address key register (AKR) load instruction for loading address keys into an address key register (AKR) from a general register or a main memory location, the address keys contained in the address key register determining the addressability currently available to the processor, the addressability definition control including

a plurality of bistable storage positions for each of plural key sections in the AKR for registering an address key in each section, the registered keys in the AKR defining the current addressability of the processor,

a plurality of single key ingates separately connected to inputs of each of the key sections in the AKR, a multiple key ingate connected to inputs of all of the single key sections, a plurality of single key signal lines respectively connected to the plurality of single key ingates, and all of the single key signal lines also connected to the multiple key ingate,

a control store decoder having as outputs single and multiple key ingate control lines for connecting control signals activated by microcode received from a control store to the respective ingates, the decoder activating one of the control lines selected by the instruction,

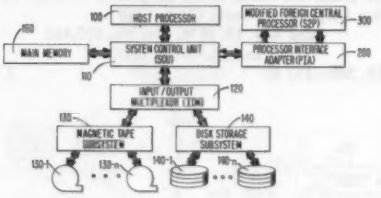
means for outputting address signals from the instruction for selecting a general register or a main memory location containing required address key signals, means for connecting the selected general register or memory location to a processor data path, and

any ingate control line activated by the decoder in response to the instruction to select any single key section or all key sections for transferring one or multiple address key signals into the AKR from the processor data path, which is currently connected to a selected general register or memory location to load the processor with one or plural addressabilities.

4,042,914
MICROPROGRAMMED CONTROL OF FOREIGN PROCESSOR CONTROL FUNCTIONS

John L. Curley, Sudbury; C. William Dawson, East Bridgewater; Arthur A. Parmet, Waltham, and Donald R. Taylor, Framingham, all of Mass., assignors to Honeywell Information Systems Inc., Waltham, Mass.

Filed May 17, 1976, Ser. No. 687,282
Int. Cl.[2] G06F 9/16, 16/16, 15/38, 15/18
U.S. Cl. 364—200 **39 Claims**



1. A system for executing instructions of a target syste program, said system including a host processor, a main memory and a system control unit coupled to said host processor and to said main memory, said main memory including a plurality of memory areas, a first area storing said instructions of said target system program and a second area storing a plurality of channel commands, said plurality including at least one channel control command coded to specify a number of functions required for initiating the execution of said target system program by said system, said system further including an emulator coupled to said system control unit for fetching said commands and said instructions from said memory, said emulator comprising:

a microprogrammed adapter for executing said plurality of said channel commands fetched from said second area, said adapter comprising:

an addressable control store for storing a plurality of sequences of microinstructions;

branch and test control means for controlling the addressing of said control store during the execution of each said channel command, and for testing the presence of operations coded in the control portion of said one channel control command for establishing next microinstruction sequences to be referenced;

decoder circuits coupled to said control store for generating command control signals in response to the read out of said plurality of microinstruction sequences;

control logic circuits coupled to said decoder circuits;

an input/output processing section coupled to said control store, said decoder circuits, and said system control unit for receiving information from said main memory, including said one channel control command; and

a control interface coupled to said decoder circuits and to said control logic circuits;

said processing apparatus further including:

a processing unit for processing said instructions, said processing unit being coupled to said input/output processing section and to said control interface, said processing unit comprising:

control circuits;

an arithmetic and logic unit; and

a control memory;

said control circuits, said arithmetic and logic unit and said control memory being coupled to said control interface,

said control store being operative in response to receipt of said one channel command to reference a first one of said microinstruction sequences, said decoder circuits generating a set of said command control signals for conditioning said control logic circuits to apply signals to said control interface for presetting said arithmetic and logic unit, said control memory, and said control circuits to the proper

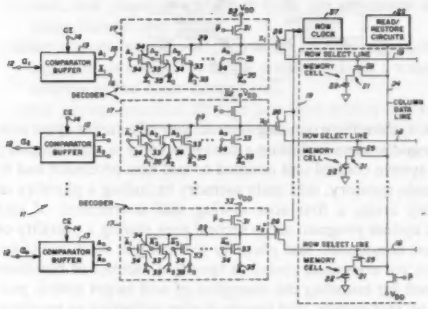
operational states specified by said coded functions within said one channel command for proper execution of sid instructions of said target system program.

4,042,915

MOS DYNAMIC RANDOM ACCESS MEMORY HAVING AN IMPROVED ADDRESS DECODER CIRCUIT

John A. Reed, Los Altos, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Apr. 15, 1976, Ser. No. 677,461
Int. Cl.[2] G11C *8/00*
U.S. Cl. 340—173 R 2 Claims



1. In an MOS dynamic random access memory:

memory means providing a matrix of individually selectable memory cells for storing data therein and for reading out data therefrom;

address input terminal means for receiving address input signals for addressing said memory means;

buffer means responsive to said input address signals on individual ones of said address input terminal means for generating pairs of complementary address signals in response to respective ones of said input address signals;

address decoder means responsive to said pairs of complementary address signals for producing a decoded memory accessing output signal for accessing an addressed cell in said memory means;

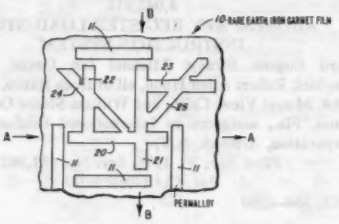
said address decoder means including, a decoder output line means on which said memory accessing decoder output signal is generated, means for precharging said decoder output line means to a predetermined electrical potential, a plurality of decoder transistor means coupled in parallel to said decoder output line means for selectively changing the potential of said decoder output line in response to said pairs of said complementary address signals, and wherein individual ones of said decoder transistor means includes first and second terminal means and a gate terminal means for gating current flow between said first and second terminal means, said first terminal means being coupled to said decoder output line means, and said gate and second terminal means of respective ones of said decoder transistor means being coupled to the output of respective ones of said buffer means to receive a respective one of said pair of complementary address signals thereon for controlling the conduction of current through respective ones of said decoder transistor means in response to the pair of complementary address signals applied between said gate and second terminals of respective ones of said decoder transistor means, whereby the timing of the conduction of current through respective ones of said decoder transistors is controlled by the generation of said pair of complementary address signals.

4,042,916

MAGNETIC BUBBLE TRACK CROSSOVER ELEMENT

Christopher Teh-Min Chang, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Sept. 15, 1975, Ser. No. 613,730
Int. Cl.[2] G11C *11/02*
U.S. Cl. 340—174 TF 5 Claims



1. In a magnetic bubble domain system including a layer of magnetic material in which magnetic bubble domains can be propagated, and a magnetizable overlay pattern on one surface of said layer and having a magnetization in the plane of said overlay pattern for defining propagation paths for magnetic bubble domains,

at least a pair of magnetic bubble domain propagation paths included in said magnetizable overlay pattern,

said pair of magnetic bubble domain propagation paths intersecting with each other, and

magnetic bubble domain crossover means included in said magnetizable overlay pattern and disposed at the intersection of said pair of propagation paths for regulating the flow of individual bubbles from the respective propagation paths in crossing the intersection to travel along the respective propagation paths free from interference with each other in response to an in-plane rotating magnetic field, said magnetic bubble domain crossover means comprising

first and second L-shaped members arranged in orthogonally offset relationship with respect to each other and including respective leg portions extending at right angles to each other and intersecting intermediate the ends thereof,

said first and second L-shaped members having other leg portions disposed in spaced orthogonal relation with respect to each other and integral with the one of said first-mentioned leg portions corresponding thereto, and

magnetic bubble domain retention means associated with each of said L-shaped members controlling movement of magnetic bubble domains along the said pair of propagation paths of magnetizable material included in said magnetizable overlay pattern.

4,042,917

MAGNETO-RESISTIVE DOMAIN DETECTOR FOR CYLINDER-DOMAIN-TRANSPORT MEMORY

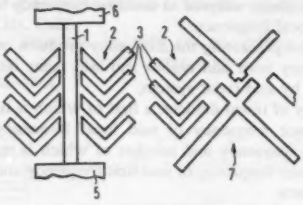
Arnulf Lill, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Aug. 21, 1975, Ser. No. 606,477
Claims priority, application Germany, Aug. 27, 1974, 2440997
Int. Cl.[2] G11C *11/02*
U.S. Cl. 340—174 TF 6 Claims

1. A magneto-resistive domain detector for reading the stored information of a cylinder-domain transport memory comprising:

a layer-shaped detector strip disposed on the memory per-

pendicularly to the cylinder domain path and being formed of a magneto-resistive material and having a do-



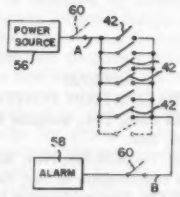
main stretcher adjacent to but galvancially decoupled from the detector strip.

4,042,918

APPARATUS INDICATING AN ABSENT GOLF CLUB

Charles B. Klitzman, 211 Parker Ave., Deal Park, N.J. 07723

Filed May 4, 1976, Ser. No. 683,165
Int. Cl.[2] G08B *13/14, 21/00*
U.S. Cl. 340—280 **7 Claims**



1. Apparatus for a golf bag to indicate the absence of a golf club, comprising:

power supply means;

alarm means; and

switch means coupling said power supply means and said alarm means in series circuit;

and wherein said switch means includes a body section having a plurality of elongated passageways through which golf clubs are inserted into and removed from said bag and a control switch located within each of said passageways to be actuated to a first condition when a golf club is inserted into said bag and to be actuated to a second condition when a golf club is removed from said bag.

4,042,919

ILLUMINATED SIGN AND HIGH INTENSITY WARNING DEVICE

Richard L. Patty, Box 56, New Haven, Ind. 46774

Filed Nov. 10, 1975, Ser. No. 630,443
Int. Cl.[2] G08B *5/00;* **H05B** *41/00*
U.S. Cl. 340—321 **5 Claims**

1. An illuminated sign comprising:

a frame having a perimetral wall to define a frame opening;

a perimetral frame flange formed on each wall edge and extending inwardly from the wall;

a first panel connected at its circumferential edge to one perimetral flange and a second panel connected at its circumferential edge to the other perimetral flange, at least one of said panels being of a light transmissive material;

an elongate lighting device having at one end thereof a bulbous housing having an open end; a light emitting element; said housing supporting said light emitting element and reflector means directing the light emission from said element;

an annular cap having a perimetral rim depending from the outer circumference thereof; said rim having an edge defining an opening for receiving the open end of said housing in close-fitting relation; a wall portion of said frame having a wall opening therein for receiving said open end in close-fitting relation;

said rim and said housing being in threadedly removable and adjustable engagement; said cap being threadedly tightened against said wall portion;

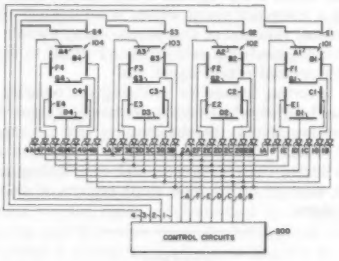
an annular wall receiving step being axially displaced from said housing open end; said step receiving and supporting said wall portion adjacent said wall opening and said wall portion adjacent said wall opening being firmly clamped between said step and said rim edge when said rim is threadedly tightened on said housing.

4,042,920

MULTIPLEXING CIRCUIT FOR LIQUID CRYSTAL DISPLAY

Thomas B. Harsch, Stow, and Edd Dems, Parma, both of Ohio, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation of Ser. No. 320,581, Jan. 2, 1973. This application Aug. 12, 1976, Ser. No. 713,755
Int. Cl.[2] G06F *3/14*
U.S. Cl. 340—324 M **6 Claims**



1. In an optical display system wherein electrical intelligence is converted into optical images through the use of a liquid crystal display, the combination of a layer of liquid crystal material sandwiched between a pair of transparent parallel plates, the inner surface of one of the plates in contact with the liquid crystal material having sets of mutually-insulated transparent conductive segments thereon which are arranged in essentially identical patterns, the inner surface of the other of said plates in contact with the liquid crystal material having patches of transparent conducting material thereon directly opposite cooperating sets of segments whereby establishment of an electrical potential between a segment and its cooperating patch on the opposite plate will change the optical appearance of that segment, there being *n* sets of segments and *n* patches on the opposite plate with *x* segments in each set, *x* conductors each connected to a corresponding one of the segments in each set, *n* conductors connected to the respective patches, means for applying pulses through the *x* conductors to the segments of all sets simultaneously in a sequence wherein the pulse sequence on the *x* conductors is adapted to change *n*

times during a complete cycle, and means for applying during said cycle n pulses to said n conductors and the conducting patches, said n pulses being applied to the n conductors in succession and simultaneously with application of pulses to the x conductors whereby different configurations can be made to appear to the eye at successive segment locations.

4,042,921

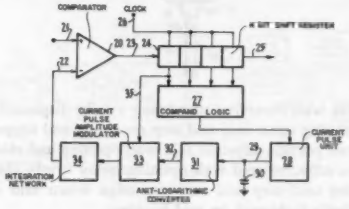
DIGITAL ENCODER/DECODER

Peter Leslie Smith, Northcote, Australia, assignor to L.M. Ericsson Pty Ltd., Victoria, Australia

Continuation-in-part of Ser. No. 423,813, Dec. 11, 1973, abandoned. This application Sept. 17, 1974, Ser. No. 506,777

Int. Cl.[2] H03K *13/22*

U.S. Cl. 340—347 AD **11 Claims**



1. An average peak slope companded delta codec for converting an analog signal to a digital signal comprising:

comparator means receiving said analog signal and a variable construction signal for converting said analog signal to a digital bit stream,

detecting means for detecting the presence of at least one preselected sequence of bits in the digital bit stream,

means responsive to said detecting means for generating an attack/decay signal which increase upon the occurrence of said preselected sequence and decreases upon the non-occurrence of said preselected sequence,

converter means receiving said attack/decay signal for providing a compand signal which is substantially an anti-logarithmic function of said attack/decay signal,

means for accumulating said compand signal to form said variable reconstruction signal, and

polarity inverting means for inverting the polarity of said compand signal when said reconstruction signal exceeds said analog signal, thereby causing said reconstruction signal to change in value toward the value of said analog signal during each bit period, said companding adjusting to the average of the high slope regions of said analog input signal.

4,042,922

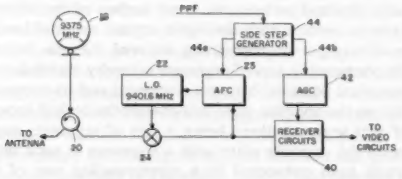
MULTI-MODE RADAR SYSTEM

Eckard F. Natter, Coral Springs; George E. Weant, Fort Lauderdale, and James R. Lobsinger, North Lauderdale, all of Fla., assignors to The Bendix Corporation, Southfield, Mich.

Filed Sept. 3, 1976, Ser. No. 720,338

Int. Cl.[2] G01S *7/40, 9/60*

U.S. Cl. 343—5 W **2 Claims**



1. A multi-mode radar system having a high power source operating at a first frequency wherein said radar system periodically transmits signals at said first frequency to thereby elicit beacon replies at a second frequency and radar returns essentially at said first frequency, said replies and said returns being subsequently intercepted by said radar system and comprising;

a local oscillator referred to said first frequency for generating a local frequency;

a mixer for generating the frequency products of said local frequency with said replies and said radar returns intercepted by said radar system;

a plurality of tuned devices, a first of which is tuned to the difference frequency of said local frequency and said second frequency and another of which is tuned to the difference frequency of said first frequency and said local frequency;

means for selecting one of said tuned devices to receive said frequency products; and,

side step generator means comprising a timer which is reset to an initial time by each of said periodically transmitted signals and which thereafter side steps said local oscillator a predetermined time after being so reset.

4,042,923

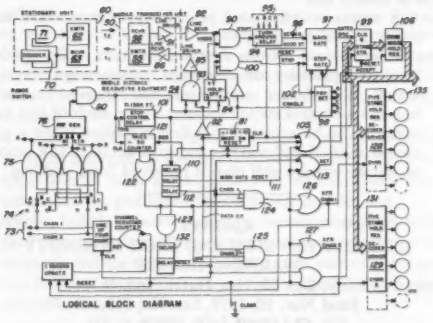
RADAR TRILATERALIZATION POSITION LOCATORS

James W. Merrick, El Paso, Tex., assignor to Del Norte Technology, Inc., Euless, Tex.

Continuation of Ser. No. 420,448, Nov. 30, 1973, Pat. No. 3,918,056, which is a continuation of Ser. No. 195,687, Nov. 4, 1971, Pat. No. 3,810,179. This application Oct. 16, 1975, Ser. No. 622,841

Int. Cl.[2] G01S *9/02*; G06F *11/00*

U.S. Cl. 343—6.5 LC **8 Claims**



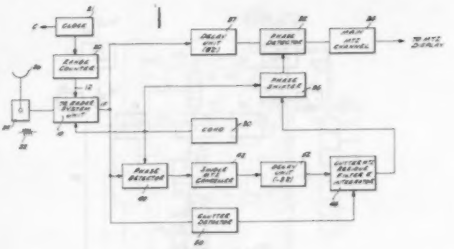
1. Means for validating timed radar signals comprising means for repeatedly storing initial data responsive to transmitting radar signals, data accumulation means, means for transferring said initially stored data to said data accumulator means whereby said accumulator means stores an average of previously received data which was initially stored and then transferred to said accumulator, means in said accumulator for accepting the transferred data which is consistent with previously accumulated data and rejecting data which is non-consistent therewith, means responsive to the receipt of non-consistent data for returning said initial data storage means to a condition wherein it stores the last previously received consistent data, and means responsive to the accumulation of a predetermined amount of said accepted data for giving a read out of the average of said accumulated data.

4,042,924

MTI CLUTTER TRACKING AND CANCELLING SYSTEM

Norol T. Evans, San Pedro, and Francis J. Wunderlich, Placentia, both of Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Feb. 25, 1970, Ser. No. 17,992
Int. Cl.[2] G01S 9/42
U.S. Cl. 343—7 A 16 Claims



8. In a moving target indication radar system of the type including means for transmitting energy of a predetermined frequency which is reflected by targets including clutter, means for receiving said reflected energy, a coherent source of energy of a fixed frequency, means for converting the reflected energy into intermediate frequency signals from each of a succession of range bins from which said energy was reflected, a main phase detector to which said intermediate frequency signals and the energy from said coherent source are applied and a main canceller for providing an output representing moving-target-indication residue from one transmission to the next, a clutter detection and cancelling system comprising:

a moving target indication clutter channel responsive to said intermediate frequency signals and to said coherent energy for providing a clutter moving target indication residue for each range bin from transmission to transmission; and

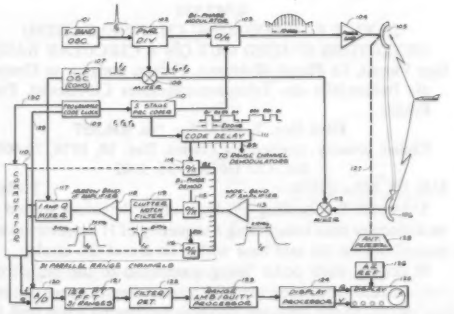
control means responsive to said clutter residue for controlling the phase of the energy from said coherent source which is applied to the main phase detector.

4,042,925

PSEUDO-RANDOM CODE (PRC) SURVEILANCE RADAR

Damian F. Albanese, Chatsworth; Frank J. O'Farrell, Valencia; David E. Hammers, and Henry R. Kennedy, both of Los Angeles, all of Calif., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Nov. 24, 1975, Ser. No. 634,890
Int. Cl.[2] G01S 9/23, 9/24
U.S. Cl. 343—14 15 Claims



1. A CW pseudo-random coded radar system including transmitting means for generating a CW carrier transmission modulated by a maximal length code PRC code and including receiving means responsive to echo signal energy reflected from objects illuminated by said transmitting means, comprising:

first means for generating said code as a repetitive pseudo-random digital code word of L bits each τ_b in duration, said first means also including a modulator for applying said code word as a bi-phase code to said carrier;

clock means connected to control said first means, the frequency of said clock being programmed in at least two predetermined clock frequency periods;

second means responsive to said first means for delaying said code by L τ_b and having L taps spaced τ_b to provide L delay outputs;

third means comprising L demodulation channels, each of said channels arranged to correlated signals from said receiving means against a corresponding one of said demodulator channels;

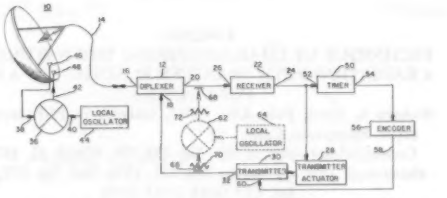
and fourth means responsive to the outputs of said L channels for producing a composite signal comprised of successive samplings of the outputs of said L channels.

4,042,926

AUTOMATIC TRANSPONDER

Roy E. Anderson, Schenectady; Alex F. Brisken, Ballston Lake, and James R. Lewis, Schenectady, all of N.Y., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Mar. 27, 1975, Ser. No. 562,499
Int. Cl.[2] G01S 7/40
U.S. Cl. 343—17.7 11 Claims



7. A method for determining the internal delay time of a transponder of the type adapted to generate a first transmit signal in response to a first receive signal comprising:

detecting said first transmit signal, generating a second receive signal in response to said first transmit signal, said second receive signal characterized by a frequency the same as said first receive signal whereby said transponder generates a second transmit signal delayed in time from said first transmit signal by said delay time of said transponder,

measuring the time between said first and second transmit signals and transmitting a signal indicative of said time.

4,042,927

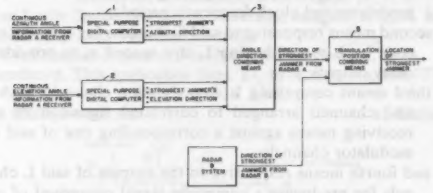
ABILITY OF A MONOPULSE RADAR TO RESOLVE AND TRACK JAMMERS PASSIVELY

Howard D. Helms, Brookside, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed June 25, 1971, Ser. No. 160,075
Int. Cl.[2] G01S 7/36, 9/02, 9/22
U.S. Cl. 343—18 E 1 Claim

1. A detector comprising an input means having an input which receives continuous information and a plurality of outputs; a control means connected to said input means so as to cause the input means to sample the continuous information at discrete intervals and present the sampled information at its outputs; a plurality of counters; steering means connected between outputs of the input means and the inputs of the count-

ers so as to cause a predetermined counter to count one each time a corresponding predetermined range of sample information is sampled by the input means; each of said counters having an output when it over-flows; and an output means connected to said counters so as to indicate which counter has overflowed; said control means is a pulse generator which is further connected to the steering means so as to provide a pulse

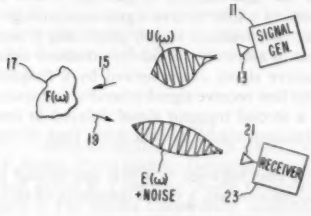


to be delivered to the proper counter; and further comprising an OR gate having a plurality of inputs connected to the overflow outputs of the plurality of counters; and a flip-flop means having an input connected to the output of the OR gate and an output connected to the pulse generator so as to turn off said pulse generator when an overflow of one counter is sensed by the OR gate.

4,042,928
TECHNIQUE OF CHARACTERIZING THE NATURE OF A RADIATION PATH TRANSFER FUNCTION BY A FEW CONSTANTS

Richard A. Altes, Palo Alto, Calif., assignor to ESL Incorporated, Sunnyvale, Calif.

Continuation-in-part of Ser. No. 453,799, March 22, 1974, abandoned. This application Mar. 31, 1976, Ser. No. 672,315
Int. Cl.[2] G01S *9/02, 9/66*
U.S. Cl. 343—5 SA **9 Claims**



1. A method of determining characteristics of a radiation path comprising the steps of:

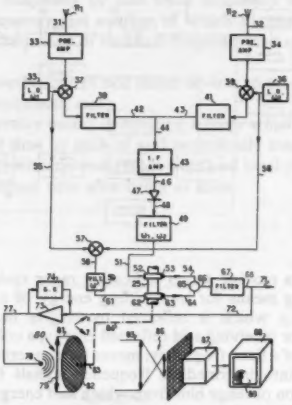
transmitting a radiation signal through said radiation path, thereby modifying said radiation according to the characteristics of said path, said transmitted radiation signal comprising a chirped burst of energy with a known frequency domain distribution such that when multiplied by the frequency raised to an integer power the new frequency domain distribution is a scaled version of the transmitted signal and decorrelated therefrom, and

comparing characteristics of the transmitted radiation signal and the modified radiation signal in a manner to determine Taylor series coefficients of a transfer function of said radiation path, whereby said coefficients are characteristic of a transfer function of said radiation path.

4,042,929
HELICOPTER NAVIGATION SYSTEM

Jacques A. Dorey, Combs-la-Ville, France, assignor to Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.), Chatillon, France

Filed Apr. 25, 1975, Ser. No. 571,764
Claims priority, application France, Apr. 26, 1974, 74.14671
Int. Cl.[2] G01S *5/02*
U.S. Cl. 343—113 DE **13 Claims**



1. A navigation system for a helicopter having a body provided with rotor blades turning about an axis of a rotor shaft, comprising:

two antennas carried by said blades at points remote from said axis for receiving electromagnetic waves radiated by a beacon of predetermined location;

processing means on said body including two generators of local oscillations, two mixers for respectively heterodyning received waves from said antennas with said local oscillations to produce two intermediate-frequency signals, nonlinear impedance means connected to said mixers for multiplying said intermediate-frequency signals with each other to produce a resulting signal, and detector means connected to said impedance means for deriving a phase-modulated output signal from said resulting signal;

evaluation means connected to said detector means for correlating said output signal with a set of spatial coordinates; and

integrating display means connected to said evaluation means for indicating the spatial coordinates associated with said output signal.

4,042,930
DEVICE FOR FORMING CHANNELS USING DETECTORS SPACED OUT ON A CIRCULAR BASE

Guy Parent, Le Plessis Robinson, France, assignor to Compagnie Industrielle des Telecommunications Cit-Alcatel, Paris, France

Filed Dec. 2, 1975, Ser. No. 636,857
Claims priority, application France, Dec. 10, 1974, 74.40457
Int. Cl.[2] G01S *3/06, 3/82*
U.S. Cl. 343—113 R **9 Claims**

1. Device for forming channels using detectors spaced out on a circular base comprising a sequency of H detectors evenly spaced out on the said base within an arc of the circle;

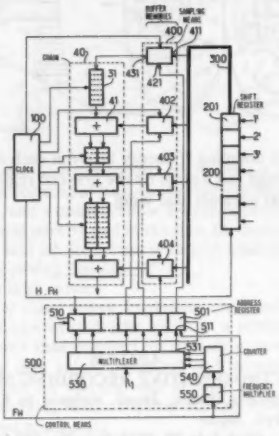
H coders, each coder being connected to the output of a detector and being used for transcoding the analog output signal of the detector into a signal having s bits ($s \geqq 1$);

a chain constituted by an alternate sequence of (N−1) delay devices and by (N−1) main adders (N <H), each adder comprising an input A connected to the output of a delay

device and a lateral input B, each delay device comprising at least an elementary delay cell;

distributing means for the signals sent out by the coders to the input of the chain and to the lateral inputs of the (N−1) adders;

a clock used for controlling the said distributing means at the frequency F_H, the data staying only during a period $1/F_H$ in an elementary cell and for controlling the transfer of the



signals along the chain characterized in that the said distribution means (20) comprise: means (200) for sampling and memorizing the signals coming from the H coders;

a bus bar system (300) on which the signals memorized as a whole pass; means (400) for sampling at the frequency F_H, the said signals on the bus bar system (300) used for feeding the input of the chair (40) and the lateral inputs of the (N−1) adders (41, 42, 43);

controls means (500) for the sampling means (400).

4,042,931

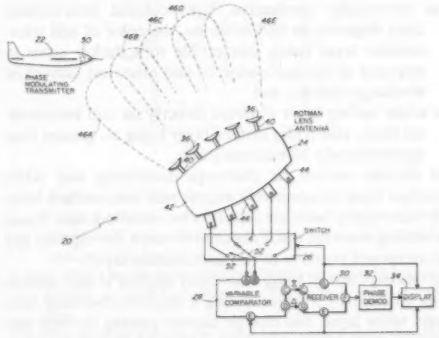
TRACKING SYSTEM FOR MULTIPLE BEAM ANTENNA

Sven G. Gustafsson, Billdal, Sweden, assignor to Raytheon Company, Lexington, Mass.

Filed May 17, 1976, Ser. No. 687,051

Int. Cl.² G01S *5/02*

U.S. Cl. 343—117 R **8 Claims**



1. A tracking system comprising:

comparator means having first and second hybrid couplers and first and second phase shifters, the phase shift of said first phase shifter occurring in increments which are of equal magnitude to and of opposite sign to increments in the phase shift of said second phase shifter, said first phase shifter being connected between one output port of said first coupler and one input port of said second coupler, said second phase shifter being connected between a second output port of said first coupler and a second input port of said second coupler, said first coupler having a plurality of input ports for coupling to an antenna system having a multiple beam radiation pattern;

means coupled to said second hybrid coupler for sensing a direction relative to said radiation pattern of radiant energy incident upon said antenna, said sensing means providing signals to said first phase shifter and said second phase shifter for controlling the magnitudes of said shifts whereby a null between two beams of said radiation is positioned along the direction of said incident radiant energy;

a switch for sequentially coupling said first hybrid coupler to pairs of beam output signals of said antenna system; and wherein

said sensing means further provides a first signal indicating that the magnitude of one of said shifts is greater than a predetermined amount, and a second signal indicating a sign of said first signal, said sensing means further comprising a counter responsive to said second signal for counting occurrences of said first signal, a count of said counter being coupled to said switch for operating said switch to a different position thereof corresponding to said count.

4,042,932

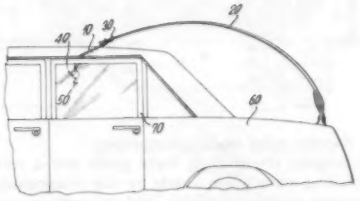
ANTENNA ANCHOR FOR AUTOMOBILES

Guy Thomas Amodeo, 202 Jefferson St., East Islip, N.Y. 11730

Filed July 13, 1976, Ser. No. 704,918

Int. Cl.² H01E *1/32*

U.S. Cl. 343—715 **2 Claims**



1. An anchor for a whip antenna comprising a flexible line means for connecting said line to an end portion of a whip antenna for automobiles and arranged to bow the antenna to a lowered position when downwardly drawn, a cushioned abutment mounted at the lead end of the flexible line and adapted to hold the antenna in a lowered position when the flexible line is clamped by a vehicle door, the flexible line extending exteriorly of the vehicle over the door gasket when the antenna is so anchored.

4,042,933

ANTENNA LINE SCAN SYSTEM FOR HELICOPTER WIRE DETECTION

Roger H. Lapp, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 19, 1976, Ser. No. 668,776

Int. Cl.² H01Q *3/12, 19/18*

U.S. Cl. 343—761 **12 Claims**

1. A line scan antenna system comprising:

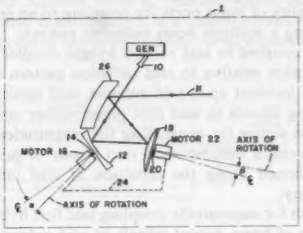
means for generating a radar ray,

a tertiary curved generally spherical concave reflector positioned to receive and reflect the radar ray generated by the ray generating means,

a secondary curved reflector of curvature opposite that of the tertiary curved reflector positioned to receive and

reflect the rays coming from the tertiary curved reflector, and

means for rotating the secondary curved reflector in a tilted fashion with respect to its optical centerline in one direction and for rotating the tertiary curved reflector in a tilted fashion with respect to its optical centerline synchronously and in phase but in the opposite direction of the secondary reflector to effect cancellation of reflection in one plane.

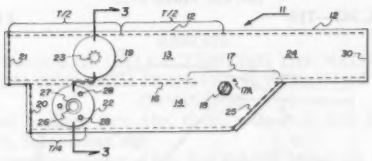


4,042,934

DOPPLER RADAR MODULE EMPLOYING COUPLED RECTANGULAR WAVEGUIDES

John W. Davis, San Diego, Calif., assignor to Radar Control Systems Corporation, San Diego, Calif.

Filed June 5, 1975, Ser. No. 584,109
Int. Cl.[2] G01S *9/42*; H01Q *13/06*
U.S. Cl. 343—786 **7 Claims**



1. A doppler radar module comprising:

a rectangular transmitting wave guide and a rectangular receiving wave guide in side by side relationship with a common wall therebetween, said transmitting wave guide having a shorted end, transmitter means based from said shorted end and an open end coupled to free space, said receiving wave guide having a shorted end and a receiver means spaced therefrom; and

an aperture disposed in said common wall, said aperture operable for coupling a portion of any transmitted energy into said receiving wave guide.

4,042,935

WIDEBAND MULTIPLEXING ANTENNA FEED EMPLOYING CAVITY BACKED WING DIPOLES

James S. Ajioka, and George I. Tsuda, both of Fullerton, Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Continuation-in-part of Ser. No. 493,791, Aug. 1, 1974, abandoned. This application Oct. 8, 1975, Ser. No. 620,896
Int. Cl.[2] H01Q *9/16, 21/26*
U.S. Cl. 343—795 **11 Claims**

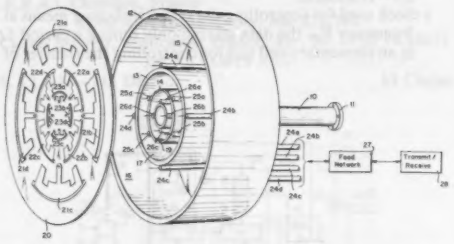
1. An antenna feed system comprising, in combination:

a plurality of coaxially disposed conductive cylinders of progressively larger diameters, each having first and second end regions, the first end regions of said cylinders being in substantial transverse alignment;

a plurality of annular conductive members, one of said conductive members being conductively joined between adjacent cylinders across the second end regions thereof;

at least one pair of thin conductive wings extending outwardly in a generally radial direction from opposite sides of each inner cylinder toward the next adjacent outer cylinder, said conductive members being insulated from said cylinders and being substantially parallel to the plane formed by said first end regions; and

means for coupling rf energy between each of said conductive wings and a point on the first end region of the cylinder next adjacent said wing.

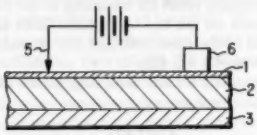


4,042,936

ELECTROSENSITIVE RECORDING METHOD

Akira Yoshikawa, Ebina, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed July 29, 1975, Ser. No. 600,160
Int. Cl.[2] G01D *15/06*
U.S. Cl. 346—1 **2 Claims**



1. A recording method comprising the steps of

selectively applying electric current or discharge to an electrosensitive member comprising

a substrate;

an electrically conductive, light colored intermediate layer disposed on said substrate, the color of said intermediate layer being convertible to a darker color in response to the application of said electrical current or discharge thereto; and

a white surface layer disposed directly on said intermediate layer, said white surface layer being no greater than approximately 10 microns thick;

said electric current or discharge destroying said white surface layer to selectively expose said intermediate layer in accordance with an image to be recorded, said image resulting from the color contrast between the exposed and nonexposed portions of the intermediate layer,

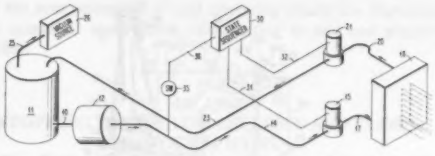
said electric current being selectively applied to said recording member by a stylus having a small contact area with said white layer, said electric current passing through said intermediate layer to a counter electrode in contact with said white layer, the contact area of said counter electrode with said white layer being substantially greater than the said contact area of said stylus with said white layer so that the white layer is not destroyed as current passes back to said counter electrode from said intermediate layer through said white layer.

4,042,937

INK SUPPLY FOR PRESSURIZED INK JET

Francis James Perry, Morgan Hill, and Anthony Vesci, San Jose, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed June 1, 1976, Ser. No. 691,699
Int. Cl.[2] G01D *15/18*
U.S. Cl. 346—1 14 Claims



1. In a constant flow pressurized ink jet system including an ink jet head for forming at least one ink jet and having an inlet, an inlet valve, and a constant flow source of pressurized fluid connected to said inlet by said inlet valve, the method of attaining startup of said ink jet system with said head initially filled with fluid comprising the steps of:

closing said inlet valve;

said constant flow source increasing the pressure of said fluid upstream of said inlet valve to a pressure substantially greater than required for operation; and

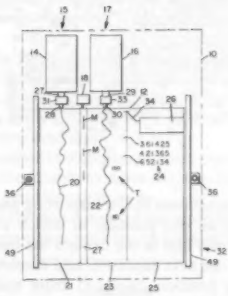
opening said inlet valve to transmit said increased pressure to said head for starting said at least one ink jet, said presure decaying to that required for operation, sustaining said at least one ink jet.

4,042,938

ANALOG AND DIGITAL DATA RECORDER

Frank Germanowski, and John A. Kazura, both of Pittsfield, Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jan. 8, 1976, Ser. No. 647,386
Int. Cl.[2] G01D *9/30*
U.S. Cl. 346—61 21 Claims



1. A data recording device, which comprises:

a housing which includes a chart paper platen adjacent on which said strip chart paper is movable positioned by said transporting means;

strip chart paper movable positioned within said housing and having at least two channels for recording data information;

a data sensing means for detecting analog data signals;

a second data sensing means for detecting discrete navigational information signals and producing digital data representative thereof;

means responsive to said analog sensing means for printing said analog data on one of said channels of said strip chart paper;

means responsive to said digital sensing means for simultaneously printing said digital data on another of said channels of said strip chart paper, wherein said means for printing digital data comprises a plurality of printing modules adjacently arranged within said housing, each of said modules having a printing wheel associated therewith, each of said printing wheels having a plurality of digital indicia positioned thereon and rotatably mounted in one end of their respective printing modules, and a control means responsive to a serial train of electrical input pulses for stepping said printing wheel in proportion thereto and for continuously processing said digital data wherein said control means further comprises print control means responsive to an electrical print command signal for actuating said plurality of printing modules and includes means responsive to a reset pulse for resetting said printing wheels to an initial position, and also wherein said chart paper platen has an aperture formed therein adjacent the location of said digital data recording means; and

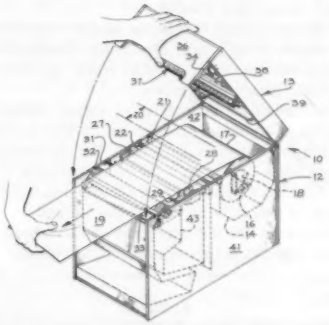
means for transporting said strip chart paper past said means for printing analog data and said means for printing digital data, wherein swift and accurate simultaneous digital and analog data correlation is obtained.

4,042,939

PRINTER/PLOTTER STYLE SYSTEM FOR CONFINED INSTALLATION AND METHOD

William A. Lloyd, San Jose; Salvatore Barone, Boulder Creek; Gerald E. Hooper, Los Altos Hills, and Keith E. McFarland, Woodside, all of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Sept. 12, 1975, Ser. No. 612,689
Int. Cl.[2] G01D *15/28;* G03G *15/00*
U.S. Cl. 346—153 17 Claims

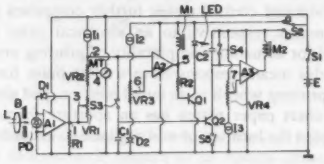


1. In a recorder system of the kind wherein a plurality of component parts are employed to produce information on a record material and including an elongate web of record material to be moved along a predetermined path, the combination comprising a housing having spaced confronting side walls, means functioning in the system as a component part of the system and extending between the confronting surfaces of said side walls, the confronting surfaces including slots formed therein in a configuration serving to receive therein end portions of said functioning means, means for affixing said end portions in said slot to employ said functioning means additionally as cross-bracing between said confronting walls of said housing, and means for forming a direct electric coupling between said walls and said component part to minimize generation of radio frequency interference and electromagnetic interference externally of said housing.

4,042,940
AUTOMATICALLY CONTROLLED EXPOSURE INDICATING DEVICE FOR A CAMERA

Motonobu Matsuda, Izumi, and Norio Beppu, Sennan, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed June 24, 1975, Ser. No. 589,859
Claims priority, application Japan, June 26, 1974, 49-72227
Int. Cl.[2] G03B 7/06
U.S. Cl. 354—39 5 Claims



1. An automatically controlled exposure indicating means in a camera having an objective lens and an adjustable diaphragm, comprising:

means for stopping-down the diaphragm from its fully open condition to the smallest diaphragm aperture prior to the exposure initiation in conjunction with the release operation;

first diaphragm aperture determining means for restraining said means stopping-down the diaphragm at a preadjusted diaphragm aperture;

a light measuring circuit for measuring the object scene light passing through the objective lens and the diaphragm;

a first circuit for generating an output corresponding to preselected shutter speed;

second diaphragm aperture determining means for restraining said means for stopping-down the diaphragm by comparing the output of said light measuring circuit with said output of said first conduit;

means for controlling the shutter speed in accordance with the output of said light measuring circuit with the diaphragm aperture determined by either said first or second diaphram determining means;

a second circuit for generating an output obtained by subtraction of *a* voltage proportional to the step numbers of diaphragm apertures to which the diaphragm can be stopped-down from the fully open condition by means of said first diaphragm aperture determining means from the output of said light measuring circuit; and

a meter circuit for indicating the shutter speed, in accordance with the output of said second circuit.

4,042,941
VEHICLE FOR TRANSPORTING AND ELEVATING ARTICLES IN RESTRICTED AREAS

Ernest E. Campbell, 1282 Mulvane, Topeka, Kans. 66604, and William H. Wells, 1317 Kallam, Topeka, Kans. 66616

Filed Dec. 29, 1975, Ser. No. 644,735
Int. Cl.[2] B66C 23/40
U.S. Cl. 254—139.1 4 Claims

1. A vehicle for transporting electrical pole mounted equipment such as a transformer to a supporting upright utility pole and hoisting said equipment to an emplacement at the top of said pole, said vehicle including:

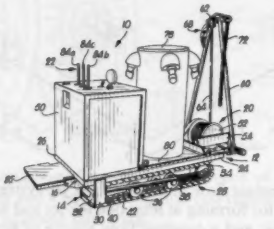
a chassis that has a narrower overall width and a shorter overall length than a standard road vehicle for rendering the vehicle maneuverable in restricted areas,

said chassis including a ground-engaging, direction controllable running gear and an elongate frame supported by said running gear;

power means carried by said frame, and operably coupled with said running gear to render said vehicle self-propelled;

hoisting mechanism mounted on said frame and operably coupled with said power means;

said mechanism including a block and tackle assembly that is releasably supportable on said pole near the top of the latter when the vehicle is hoisting said equipment;



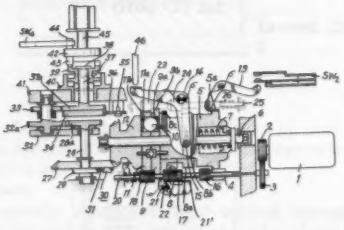
said mechanism further including a snubber assembly for releasably securing said frame to said pole during said hoisting, so that the frame is positively restrained against vertical movement relative to the pole; and

control means interconnecting said power means with said running gear and said hoisting mechanism for selectively operating the same.

4,042,942
CAMERA WITH MOTOR DRIVE

Keisuke Haraguchi, Saitama, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Japan

Filed Dec. 23, 1975, Ser. No. 643,815
Claims priority, application Japan, Dec. 28, 1974, 50-3833
Int. Cl.[2] G03B 1/18
U.S. Cl. 354—171 16 Claims



1. In a camera, combined film-transporting and shutter-cocking means having an end position in which a shutter of the camera is cocked and film in the camera has been advanced to be in position for the next exposure, said combined means also having a starting position displaced from said end position thereof and assumed by said combined means for enabling an exposure to be made, transmission means operatively connected with said combined means for displacing the latter from said starting to said end position thereof with said combined means transporting film and cocking the shutter while being displaced by said transmission means from said starting to said end position, said transmission means having the capability of releasing said combined means after the latter has reached said end position thereof and said combined means responding to release from said transmission means for automatically returning to said starting position, operating means operatively connected with said transmission means for operating the same both to displace said combined means from said starting to said end position and to release said combined means for return from said end position to said starting position thereof, said operating means having only a one-way drive connection with

said transmission means for operating the latter in one direction only, and said operating means including a motor-driven drive means for responding automatically to reaching of said end position by said combined means for terminating the operation of said transmission means, and for acting on said transmission means to disconnect the latter from said combined means so as to release the latter for automatic return to said starting position thereof, so that an exposure may be made prior to the next connection of said transmission means to said combined means and the next operation of said operating means for displacing said combined means from said starting to said end position thereof.

4,042,943

STOPPING DEVICE FOR BELLOWS AND CLOSE PHOTOGRAPHY RING

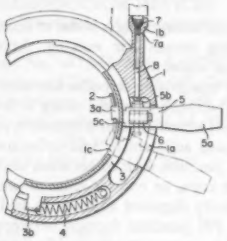
Kunihiro Fukino, Kawasaki, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Oct. 15, 1975, Ser. No. 622,518

Claims priority, application Japan, Oct. 21, 1974, 49-127166[U]

Int. Cl.² G03B *9/02*

U.S. Cl. 354—272 **5 Claims**



1. A stopping device to be positioned between a camera body and a phototaking lens, the lens having a stop and a stop lever actuating the stop for stopping down the stop at an optional predetermined position, which stop has been in the fully opened position when the lens is mounted, the device comprising:

a stop interlocking member is engagement with the stop lever at its fully open stop position and movable in a first direction a distance corresponding to the moving distance of the stop lever from its fully open stop position to its minimum stop position;

a stopping member in engagement with the stop interlocking member and operable to move the stop interlocking member in said first direction; and

means to stop the movement of the stopping member at the minimum open stop position of the stop lever.

4,042,944

MONOSTABLE MULTIVIBRATOR

Tadao Yoshida, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Apr. 25, 1975, Ser. No. 571,792

Claims priority, application Japan, May 7, 1974, 49-50515

Int. Cl.² 357 *34;* H01L *29/78*

U.S. Cl. 357—23 **5 Claims**

1. A monostable multivibrator circuit comprising:

a semiconductor device having a first semiconductor region of one conductivity type,

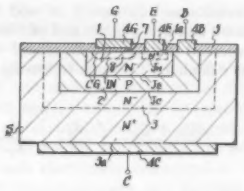
a second semiconductor region of the opposite conductivity type adjacent said first region with a first semiconductor junction therebetween,

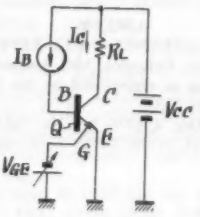
a third semiconductor region of the same conductivity type of said first region adjacent said second region with a second semiconductor junction therebetween, first, second and third terminals coupled to said first, second and third regions, respectively;

a fourth terminal connected to said semiconductor device and having at least a portion thereof located adjacent to said first region at a position which is spaced from the said first terminal, and an insulating layer separating said fourth terminal from said first region,

an emitter grounded current amplification of said device being adjustable from a relatively high value to a relatively low value by changing a voltage on said fourth terminal,

means for applying a trigger signal to the second terminal of said semiconductor device,





a circuit branch containing a capacitor, which branch connects the third and fourth terminals,

a predetermined bias being applied to said fourth terminal which is chosen such that in the absence of the trigger signal and in a steady state condition said current amplification is substantially at said relatively low value,

means for applying a power source across said first and third terminals of said device, and

second means coupled to said second terminal for biasing said device into a conducting state when said current amplification is substantially at said relatively high value.

4,042,945

N-CHANNEL MOS TRANSISTOR

Hung C. Lin, Silver Spring, and Marvin H. White, Laurel, both of Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 447,178, Feb. 28, 1974, which is a continuation of Ser. No. 257,585, May 30, 1972, abandoned. This application July 14, 1975, Ser. No. 595,458

Int. Cl.² H01L *29/78, 27/02, 29/34*

U.S. Cl. 357—23 **4 Claims**

1. An N-channel enhancement mode field effect transistor comprising:

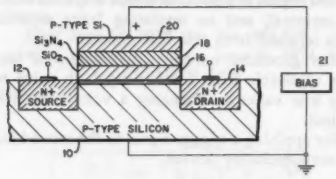
a. a substrate of P-type semiconductor material having an impurity concentration less than 10^{15} atoms per cubic centimeter;

b. first and second N-type regions within said substrate, said region respectively forming the drain and source regions of said transistor;

c. a first layer of dielectric material formed on the surface of said substrate and covering area of said substrate between said drain and source regions;

d. a second layer of insulating material overlying said first layer;

e. a layer of P-type silicon deposited on said second insulating layer, said silicon layer forming the gate of said transistor; wherein:



f. the characteristics and dimension of said substrate, said first and second insulating layers and said layers of P-type silicon are selected to cause the threshold voltage of said transistor, as calculated from the following equation:

$$V_{TN} = 2\phi_F + \phi_{GS} - \frac{(Q_{SS} + Q_S)}{\epsilon_o}\left(\frac{X_o}{K_o} + \frac{X_I}{K_I}\right) - \frac{X_I Q_I}{K_I \epsilon_o}$$

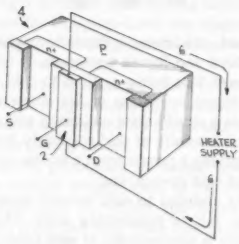
to have a selected positive value.

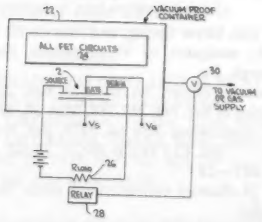
4,042,946

RADIATION HARDENED FIELD EFFECT DEVICE

Martin M. Sokoloski, Columbia, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 8, 1976, Ser. No. 748,586
Int. Cl.[2] H01L *29/78, 29/66, 23/36;* **G01T** *1/24*
U.S. Cl. 357—25 **10 Claims**





1. A solid state device which remains resistant to degradation generally caused by exposure to a hostile radiation environment which comprises:

a field-effect device whose gate electrodes comprise materials whose work function can be changed; and

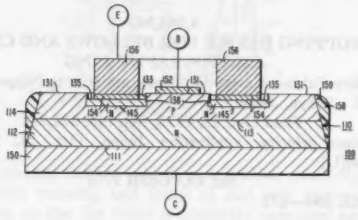
means for changing the amount of hydrogen interstitially present in the materials such that the work function of the electrode gate is varied upon a sensed change in the semiconductor's threshold voltage, whereby the degrading effects on the semiconductors threshold voltage are cancelled.

4,042,947

HIGH VOLTAGE TRANSISTOR WITH HIGH GAIN

Chang K. Chu, Pittsburgh; Philip L. Hower, Churchill Boro, and George W. Vomish, Ruffsdale, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jan. 6, 1976, Ser. No. 646,794
Int. Cl.[2] H01L *29/72*
U.S. Cl. 357—34 **1 Claim**



1. A transistor comprising a wafer of semiconductor material and contacting means for making thermal and electrical contact to said wafer;

said wafer comprising a collector zone of a first type of semiconductivity disposed along a first major surface of said wafer, a base zone of a second type of semiconductivity disposed adjacent to said collector zone, a collector-base PN junction formed between said collector zone and said base zone, an emitter zone of said first type of semiconductivity disposed adjacent to said base zone, an emitter-base PN junction formed between said emitter zone and said base zone, portions of said base zone extending past said emitter zone to a second major surface of said wafer, said second major surface being parallel to said first major surface, a beveled edge surface joins the periphery of said first and said second major surfaces, said beveled edge surface forming an acute angle with said first major surface and forming an obtuse angle with said second major surface, said beveled edge surface being separated from said emitter zone by portions of said base zone, said collector-base PN junction being parallel to said major surfaces and terminating at said beveled edge surface, a recessed surface bordering said emitter zone and parallel to said major surfaces, said recessed surface located at a predetermined depth from about 1 to 20 microns in said wafer from said second major surface;

said contacting means comprising a collector electrode affixed to said collector zone at said first major surface, a base electrode affixed to said base zone at said second major surface, a first emitter electrode affixed to said emitter zone at said recessed surface, and a second emitter electrode contacting said first emitter electrode and extending past said second major surface.

4,042,948

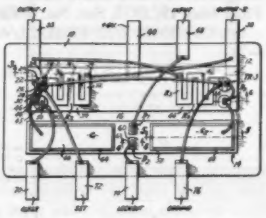
INTEGRATED CIRCUIT ISOLATION WITH MESAS AND/OR INSULATING SUBSTRATE

Jack S. Kilby, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 218,206, Aug. 14, 1962, abandoned, which is a continuation of Ser. No. 811,476, May 6, 1959, abandoned. This application May 20, 1974, Ser. No. 471,634
Int. Cl.[2] H01L *27/04, 27/12*
U.S. Cl. 357—49 **13 Claims**

1. A device comprising an insulative substrate having relatively thin overlying extrinsic single crystal semiconductor material affixed on one major surface thereof, said overlying

material being shaped to provide a plurality of regions therein said regions being electrically isolated from each other by substantial electrical impedance through said substrate and



between said regions, said regions having pluralities of P-N junctions defined therein to establish independent electronically functional structures for the performance of resistive, reactive and active signal modification functions.

4,042,949

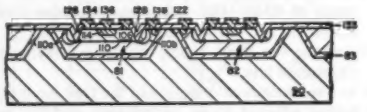
SEMICONDUCTOR DEVICES

Uryon S. Davidsohn, Scottsdale, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Continuation of Ser. No. 467,964, May 8, 1974, abandoned, which is a continuation of Ser. No. 296,641, Oct. 11, 1972, abandoned, which is a division of Ser. No. 66,164, Aug. 24, 1970, Pat. No. 3,738,877. This application July 14, 1975, Ser. No. 595,948

Int. Cl.² H01L *27/12, 29/04*

U.S. Cl. 357—49 **6 Claims**



1. A transistor comprising:

a body of semiconductor material having a planar upper surface, a lower surface and sidewalls extending between said upper surface and said lower surface;

a first layer of dielectric material formed upon at least said sidewalls of said body;

said body of semiconductor material having alternate stripe like regions of opposite conductivity, one overlying the other, with a junction between adjacent regions, and said regions forming emitter, base and collector portions respectively, and each region having an individual planar surface terminating on said common upper planar surface of said body;

said base collector junction having first and second edges located substantially parallel with each other and terminating on said common planar surface and each extending transversely across said body, and the remaining edges located substantially parallel with each other and terminating against said dielectric layer beneath said upper surface;

said body being formed with a pair of grooves and each of said grooves extending vertically into said body from said base planar surface and terminating at a first end located within said collector region and extending transversely across said surface substantially parallel with each of said first and second edges;

a surface layer of dielectric material adherent to said upper surface and formed within said grooves and joined with said first dielectric layer.

4,042,950

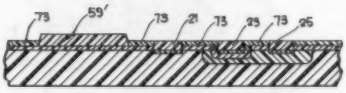
PLATINUM SILICIDE FUSE LINKS FOR INTEGRATED CIRCUIT DEVICES

William Louis Price, Saratoga, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Mar. 1, 1976, Ser. No. 662,340

Int. Cl.² H01L *27/04*

U.S. Cl. 357—51 **4 Claims**



1. A semiconductor integrated circuit comprising,

a semiconductor integrated circuit,

a plurality of spaced apart metal interconnection means integrated into said integrated circuit for linking circuit elements in said semiconductor integrated circuit, and

at least one metal silicide fuse link integrated into said integrated circuit having a generally elongated shape with opposite ends electrically connected to two selected of said metal interconnections, said fuse link having a cross sectional dimension which will electrically open by application of electrical power greater than a preselected threshold power.

4,042,951

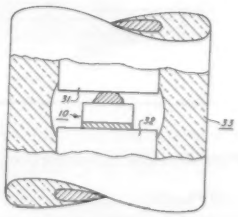
GOLD-GERMANIUM ALLOY CONTACTS FOR A SEMICONDUCTOR DEVICE

John Thomas Robinson, Dallas, and Richard A. Edwards, Richardson, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Sept. 25, 1975, Ser. No. 616,718

Int. Cl.² H01L *23/48, 29/46, 29/62, 29/64*

U.S. Cl. 357—67 **11 Claims**



1. A packaged semiconductor device comprising a semiconductor body having at least one ohmic contact on each of opposite sides thereof, sandwiched between the ends of two coaxial nickel-alloy plugs surrouned by a glass envelope sealed to said plugs, an alloy bond of one plug with one contact, and an alloy bond of the other plug with the other contact; each of said alloy bonds comprising a gold-germanium alloy.

4,042,952

R. F. POWER TRANSISTOR DEVICE WITH CONTROLLED COMMON LEAD INDUCTANCE

Albert Victor Kraybill, Arlington Heights, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

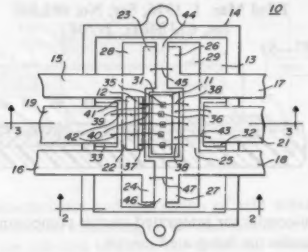
Filed June 9, 1976, Ser. No. 694,252

Int. Cl.² H01L *23/48, 27/02, 39/02*

U.S. Cl. 357—68 **11 Claims**

1. In a high frequency transistor device including a transistor chip having emitter, base and collector areas, a relatively large area input ground lead conductor means, a relatively large area output ground lead conductor means and at least two short,

small wire leads extending from one of said emitter and base areas to separate points on said input and output ground lead conductor means, means for controlling the common lead



inductance from said one of said emitter and base areas to said input and output ground lead conductor means comprising a gap in said input and output ground lead conductor means between said separate points.

4,042,953

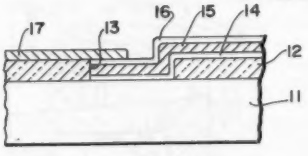
HIGH TEMPERATURE REFRACTORY METAL CONTACT ASSEMBLY AND MULTIPLE LAYER INTERCONNECT STRUCTURE

John H. Hall, Saratoga, Calif., assignor to Micro Power Systems, Inc., Santa Clara, Calif.

Continuation of Ser. No. 384,640, Aug. 1, 1973, abandoned. This application June 10, 1975, Ser. No. 585,612

Int. Cl.[2] H01L *23/48, 29/78, 27/02, 29/04*

U.S. Cl. 357—71 **13 Claims**



1. An integrated circuit interconnection structure comprising.

a silicon body having a surface,

a first insulating layer having at least one aperture formed on the surface to expose portions of the surface of said silicon body,

a refractory metal sandwich formed on the upper surface of portions of the insulating layer and at least one portion of the exposed body portion, and extending through at least one aperture to contact the silicon body,

said sandwich including solely the combination of a silicon layer formed on a body portion and on the insulating layer, a refractory metal layer formed on the silicon layer and a second silicon layer formed on the upper surface of the refractory metal layer,

a second insulating layer formed at least on portions of the upper surface of the refractory metal sandwich and on portions of the first insulating layer

at least one opening formed in said second insulating layer at said portions to expose the underlying portion of the refractory metal sandwich, and

a metal layer formed on the upper surface of portions of said second insulating layer and extending through at least one opening formed in the second insulating layer to contact said refractory metal sandwich.

4,042,954

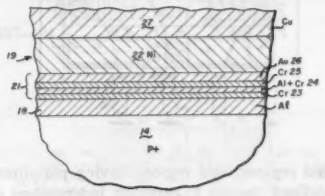
METHOD FOR FORMING GANG BONDING BUMPS ON INTEGRATED CIRCUIT SEMICONDUCTOR DEVICES

James M. Harris, San Jose, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed May 19, 1975, Ser. No. 578,653

Int. Cl.[2] B05D *5/12;* **H01L** *23/48*

U.S. Cl. 357—71 **10 Claims**



1. The method of forming gang bonding bumps on integrated circuit semiconductive devices of the type having a metallic intraconnect pattern formed on the semiconductive device, such metallic pattern to be interconnect to other structure via the intermediary of metallic gang bonding bumps adhered to and rising above the metallic intraconnect pattern, the steps of:

vacuum vapor depositing a layer of chromium within the range of 40 to 200 anstroms thickness overlaying the selected areas of the metallic intraconnect layer which are to receive the gang bonding bumps;

vacuum vapor depositing a layer of aluminun amd chromium within the range of 3,000 to 20,000 angstroms thickness over said chromium layer, such aluminum and chromium layer having a preponderance of aluminum therein;

vacuum depositing a second layer of chromium within the range of 50 to 3,000 angstroms thickness overlaying the aluminum and chrominum layer; and

depositing the gang bnding bump overlaying the second chromium layer.

6. In a semiconductive device of the type having gang bonding bumps adhered to an underlaying metallic intraconnect pattern via the intermediary of a multilayered transistion region, the transition region including:

a layer of chromium within the range of 40 to 200 angstroms thickness overlaying the selected areas of the metallic intraconnect lyer which are to receive the gang bonding bumps;

a layer of aluminum and chromium within the range of 3,000 to 20,000 angstroms thickness overlaying the chromium layer, such aluminum and chromium layer having a preponderance of aluminum therein; and

a second layer of chromium within the range of 50 to 3,000 angstroms thickness overlying said chromium layer.

4,042,955

RESIN-SEALED ELECTRICAL DEVICE

Takeshi Imai, Oobu; Tsutomu Niwa, Kariya, and Kenji Motani, Kagoshima, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Continuation of Ser. No. 480,580, June 18, 1974, abandoned. This application Mar. 22, 1976, Ser. No. 668,813

Claims priority, application Japan, June 22, 1973, 48-70917

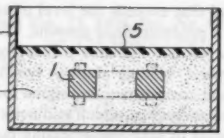
Int. Cl.[2] H01L *23/28, 23/30, 23/36*

U.S. Cl. 357—72 **3 Claims**

1. In a resin sealed electrical device comprising a case, a layer of finely divided insulating material and electrical elements both retained within said case and a resinous cover layer sealing said case,

the improvement of providing a weather-resistant and shock-resistant device comprising using a finely divided insulating layer having a grain size between about 61 and 4760 microns in size, in combination with a low viscosity

resin cover layer which resin is at least partially impregnated into the finely divided insulating layer securing and



retaining the insulating layer within said case and forming a weather-resistant cover layer sealing said case and the insulating layer and electrical elements contained therein.

4,042,956

SOLID STATE TELEVISION CAMERA HAVING A SPECIAL COLOR FILTER ARRANGEMENT

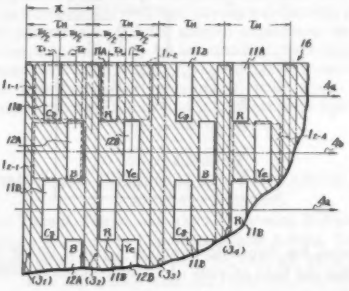
Seisuke Yamanaka, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Aug. 21, 1975, Ser. No. 606,479

Claims priority, application Japan, Aug. 22, 1974, 49-96367

Int. Cl.² H04N 9/04

U.S. Cl. 358—41 **6 Claims**



4. In a television camera the combination of a photo sensitive array comprised of individual photo sensing cells for producing a signal in relation to the light intensity projected thereon, a temporary storage array for storing electric charges generated by the light input to said photo sensing cells, a read out register for reading out signals from said temporary storage array, a filter array disposed in front of the photo sensitive array and having filter elements aligned with individual ones of said photo sensing cells, the filter elements being disposed in horizontal rows with the filter characteristics of alternate horizontal rows being alike and the filter characteristics of adjacent horizontal rows being dissimilar.

4,042,957

DISPLAY SYSTEMS

Stafford Malcolm Ellis, Maidstone, England, assignor to Elliott Brothers (London) Limited, Chelmsford, England

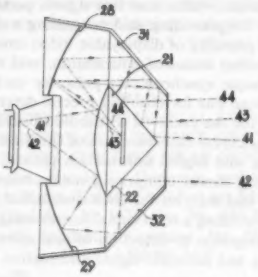
Filed Nov. 19, 1975, Ser. No. 633,501

Claims priority, application United Kingdom, Nov. 29, 1974, 51842/74

Int. Cl.² H04N 5/74; G02B 5/04

U.S. Cl. 358—109 **7 Claims**

1. A head-up display unit having: at least a part so disposed, when in used in a vehicle, as to intercept the line of sight of an observer using the unit to view a scene lying ahead of him; a light deflecting arrangement which enables the observer to see said scene substantially as if said part of the display unit were absent; a source of luminous signals; and optical means for projecting light rays from the source of luminous signals into the light deflecting arrangement so as to be deflected by said light deflecting apparatus thereby to be coincident with, and thence to follow substantially the same optical path through



the light deflecting arrangement as rays originating from said scene so to present to the observer using the unit a collimated display of said luminous signal source within his angular field of view of the said scene.

4,042,958

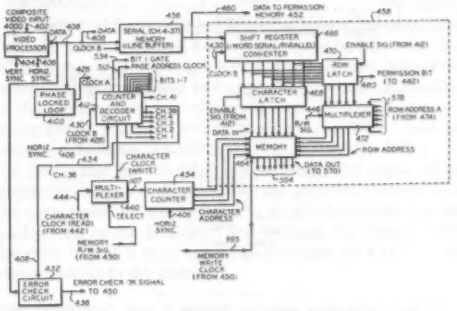
ROW GRABBING SYSTEM

Richard Saylor, Monsey, and Robert H. Nagel, New York, both of N.Y., assignors to IDR, Inc., Farmingdale, N.Y.

Filed Sept. 10, 1975, Ser. No. 611,843

Int. Cl.² H04N 1/02

U.S. Cl. 358—141 **25 Claims**



1. A real time frame grabbing system for substantially instantaneously providing a continuous video display of a selectable predetermined video frame of information on a video display means from continuously transmittable video information comprising means for transmitting said video information as a plurality of pseudo video scan lines, each of said pseudo video scan lines having a television video scan line format and capable of comprising a complete self-contained packet of digital information sufficient to provide an entire displayable row of video data characters, said pseudo video scan line having an associated transmission time equivalent to said television video scan line, said packet of digital information comprising at least address information for said displayable row and data information for said displayable characters in said displayable row, each of said pseudo video scan lines further comprising a horizontal sync signal at the beginning thereof and a start bit pulse between said horizontal sync signal and said packet of digital information, said horizontal sync signal providing a record separator between adjacent pseudo video scan lines, said transmitting means further comprising means for providing a vertical sync signal signal after a predetermined plurality of pseudo video scan lines have been transmitted, said pseudo video scan line being a composite video signal, said system further comprising television signal distribution means for distributing said transmitted composite pseudo video scan line signals to said video display means for providing said continuous video display and receiver means operatively connected

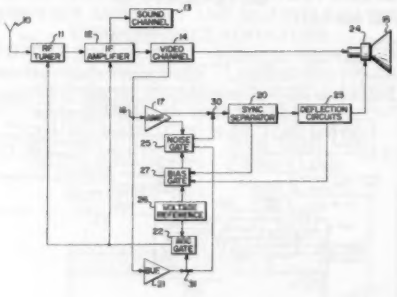
between said television signal distribution means and said video display means for processing said distributed composite pseudo video scan line signals and capable of providing a displayable video row signal to said video display means from each of said pseudo video scan line signals pertaining to said selected frame for providing said containing video display, a predetermined plurality of displayable video rows comprising a displayable video frame of information, said start bit pulse providing a unique synchronizing pulse for each transmitted pseudo video scan line for enabling precise determination of a sampling time for the received distributed pseudo video scan line to enable accurate determination of the binary state of the bits comprising said digital information packet, said receiver signal processing means comprising means responsive to the occurrence of said start bit for each distributed pseudo video scan line for providing a reset signal for resetting said processing means in response to detection of said start bit, whereby noise immunity and accurate signal information detection are enhanced.

4,042,959

NOISE SUPPRESSION CIRCUIT

Arthur H. Klein, Oakfield, N.Y., assignor to GTE Sylvania Incorporated, Stamford, Conn.

Filed May 7, 1976, Ser. No. 684,245
Int. Cl.[2] H04N *5/44, 5/21*
U.S. Cl. 358—167 **2 Claims**



1. In a television receiver having a gain controlled signal receiver for providing a composite video signal, an automatic gain control circuit for providing a gain control signal to said signal receiver, and a synchronizing pulse separator, a noise suppression circuit comprising:

first and second video signal coupling means each connected to said signal receiver for coupling at least the synchronizing pulses contained in said composite video signal to said synchronizing pulse separator and to said automatic gain control circuit, respectively;

noise detecting means connected to one of said first and second video signal coupling means for detecting noise contained in said composite video signal which has a predetermined amplitude relationship with said synchronizing pulses and for providing a noise signal representation thereof;

direct current coupling means connected to said noise detecting means and to said first video signal coupling means for coupling said noise signal to said first video signal coupling means for cancelling said moise contained in said composite video signal;

alternating current coupling means connected to said noise detecting means and to said second video signal coupling means for coupling said noise signal to said second video signal coupling means for cancelling said noise contained in said composite video signal, said alternating current coupling means coupling a noise signal of less than a predetermined duration; and

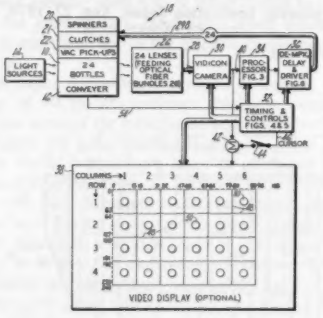
a voltage reference circuit for providing a first reference voltage to said automatic gain control circuit and a second reference voltage to said noise detecting means, said second reference voltage having a predetermined relationship to said first reference voltage for establishing a noise detecting level that exceeds the level of said synchronizing pulses by a predetermined amount, wherein said voltage reference circuit includes means for altering said second reference voltage during synchronizing pulse intervals of said composite video signal for increasing the predetermined amount by which said noise detecting level exceeds the level of said synchronizing pulses.

4,042,960

THRESHOLD SAMPLING OF VIDICON CAMERA

Harold C. Wooding, Jr., Trumbull, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Dec. 31, 1975, Ser. No. 645,577
Int. Cl.[2] H04N *5/30*
U.S. Cl. 358—217 **6 Claims**



1. Apparatus for threshold sampling a plural image video pattern within the field of view of a vidicon camera comprising:

a vidicon camera;

a plurality of optical means for presenting patterns of light disposed within the field of view of said vidicon camera in mutually dispersed relationship to provide independent images to said vidicon camera, each optical means providing a corresponding unitary image dispersed over a related one of a plurality of finite regions of said vidicon camera;

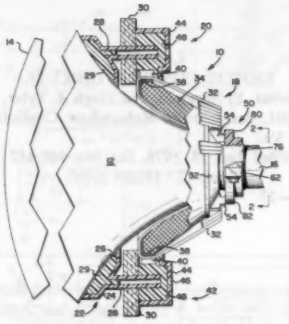
digital clock means for providing a plurality of time-related sequences of controlling signals, said digital clock means providing horizontal and vertical synchronizing signals to said vidicon camera to cause horizontal and vertical scanning thereof synchronized with said controlling signals, said controlling signals including a plurality of bit time signals dividing each horizontal scan of said vidicon camera into increments less than said finite regions, and including a plurality of column signals relating to the horizontal scan time of corresponding ones of said finite regions; and

sampling means responsive to said vidicon camera and to said digital clock means for sampling the signal output of said vidicon camera a plurality of times during each horizontal scan of each of said unitary images in the field of view of said vidicon camera in response to said controlling signals and for providing separate signal manifestations of the number of times that the video output of said vidicon camera is of a magnitude exceeding a threshold magnitude for each of said finite regions.

4,042,961
ELECTRO-OPTICAL TRANSDUCER SYSTEM

Francis J. Kraft, Waterloo, and Peter G. Puhak, Seneca Falls, both of N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Feb. 13, 1976, Ser. No. 657,712
Int. Cl.[2] H04N 5/645
U.S. Cl. 358—248 8 Claims

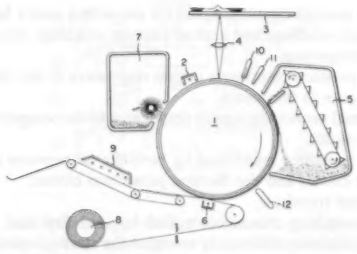


1. In an electro-optical transducer system employing a cathode ray tube having a substantially frusto-conical body terminating at its wide end in a viewable face plate and at its narrow end in a cylindrical neck and having a deflection yoke substantially permanently bonded thereto adjacent to the junction of said neck to said body by intermediate mounting means in a manner which inherently provides unwanted stresses upon said yoke, theimprovement comprising: yoke stress relief means mounted upon said neck and in contact with said yoke.

4,042,962
COMPOSITE INFORMATION OPERATING METHOD AND APPARATUS

Keizo Yamaji, Tokyo, and Akira Kurahashi, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 229,356, Feb. 25, 1972, abandoned.
This application Aug. 26, 1975, Ser. No. 607,960
Claims priority, application Japan, Mar. 1, 1971, 46-10826; Mar. 5, 1971, 46-12090; Mar. 6, 1971, 46-12014
Int. Cl.[2] G03G 15/22
U.S. Cl. 358—300 5 Claims

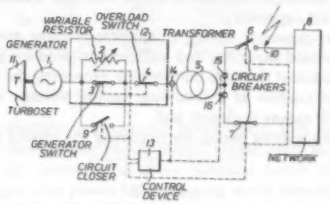


1. A method of recording composition information on an endless photosensitive member as said member is rotated, wherein said member is incorporated into a device further including means for charging said member, means for supporting an original to be copied, optical means between the supporting means and said member for projecting a light image of the original onto said member, an electrostatic recording head, and a separate charge detecting scanner and transmission head, said method comprising the steps of first uniformly charging a portion of said member with said charging means, then forming an electrostatic latent image of the original on said portion with said optical means, then forming a further electrostatic latent image on said portion from information received by said recording head, and detecting and transmitting the electrostatic latent images formed on said portion with said charge detecting scanner and transmission head, wherein all of the method stops are completed during a single rotation of said member.

4,042,963
REDUCTION OF MECHANICAL STRESSES ON TURBOSETS UPON OCCURRENCE OF THREE-POLE MAINS SHORT CIRCUITS NEAR GENERATORS

Karl Kriechbaum, Kassel-Ki, Germany, assignor to Licentia Patent-Verwaltungs-GmbH, Frankfurt am Main, Germany

Filed Jan. 20, 1976, Ser. No. 650,757
Claims priority, application Germany, Jan. 25, 1975, 2503034
Int. Cl.[2] H02H 7/06
U.S. Cl. 361—20 6 Claims

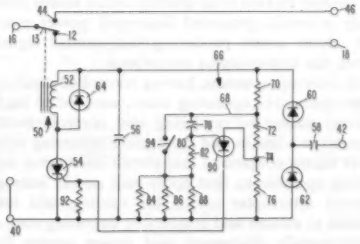


1. A method for reducing mechanical stresses on the shaft of turbosets and on the shaft of the generator coupled to the shaft of the turboset upon the occurrence of a three-pole mains short circuit near the generator and upon the subsequent elimination of the short circuit, comprising the steps of: providing a normally closed generator switch having a parallelly connected resistor, which has a size equal to approximately 80% of the full load value for the generator, between the output of the generator and the mains; opening the generator switch upon the occurrence of a short circuit to switch the resistor into the load circuit of the generator; and bridging the resistor when the short circuit is switched off of the mains by a switch provided later on in the mains.

4,042,964
MOTOR PROTECTION CIRCUIT

Richard K. Nurnberg, Norristown, and Charles H. Perkins, Newtown Square, both of Pa., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Dec. 15, 1975, Ser. No. 640,676
Int. Cl.[2] H02H 7/08
U.S. Cl. 361—28 9 Claims



1. A protection circuit unit for controlling an energization circuit for a motor, the protection circuit unit comprising

a relay having a winding, contact means for controlling the energization circuit, means responsive only to a current in

the winding greater than a predetermined current for operating the contact means, latching means for maintaining the contact means in a operated position after termination of the predetermined current, and resetting means for returning the contact means to the unoperated position;

a first capacitor;

a pair of AC voltage input terminals;

one of said pair of AC voltage terminals connected to one side of the first capacitor;

a pair of diodes serially connected with the same polarity across the first capacitor;

a second capacitor having one side connected to the junction between the pair of diodes;

said second capacitor having its other side connected to the other of the pair of AC voltage terminals and having an impedance value sufficient to limit current through the input terminals to substantially less than the predetermined current;

switch means connected in series with the winding across the first capacitor;

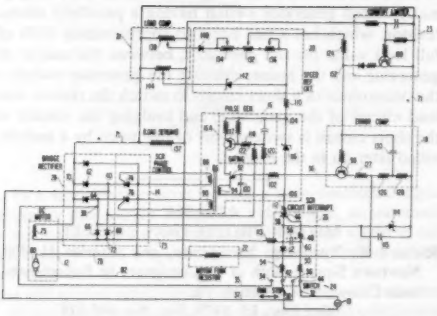
said first capacitor having a capacitance value greater than the second capacitor and sufficient to produce a momentary current through the winding exceeding the predetermined current at a minimum supply voltage when the switch means is closed; and

condition sensing means for operating the switch means.

4,042,965
POWER INTERRUPTION SAFEGUARD APPARATUS

Franklin O. Wisman, Chambersburg, Pa., assignor to T. B. Wood's Sons Company, Chambersburg, Pa.

Filed May 6, 1976, Ser. No. 683,758
Int. Cl.² H02H *7/08*
U.S. Cl. 361—29 **26 Claims**



1. In electrical apparatus wherein power is supplied from a power source to a load through power conversion means which has its operation controlled in accordance with control signals applied thereto from control circuit means powered by a supply potential generated from said power source, said control circuit means producing said control signals when operative, the improvement comprising:

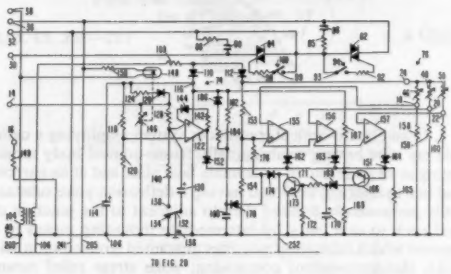
circuit interrupter means, having controlled conductive and non-conductive operating states, coupled to said control circuit means for rendering said control circuit means operative when in said conductive operating state; and

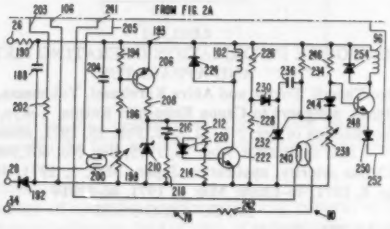
circuit means coupled to said circuit interrupter means and being operable to first apply said power source to said circuit interrupter means for causing said interrupter means to assume said conductive operating state and then subsequently disconnect said power source from said circuit interrupter means and apply said power source to said power conversion means, said circuit interrupter means assuming said non-conductive operating state in the event of a power outage from said power source to render said control circuit means inoperative until said circuit means reapplies said power source to said circuit interrupter means.

4,042,966
MOTOR CONTROL CIRCUIT

Dennis E. Newell, El Segundo, and Hugh J. Tyler, Santa Ana, both of Calif., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Jan. 15, 1976, Ser. No. 649,432
Int. Cl.² H02H *5/04*
U.S. Cl. 361—27 **21 Claims**





7. In a control circuit adapted for use with a motor having a set of main windings and a set of start-up windings, the combination comprising

an oil pressure responsive circuit responsive to the lubricant pressure in the motor,

a thermal protection circuit responsive to the temperature of the motor,

a first transistor controlled by both the oil pressure responsive circuit and the thermal protection circuit,

a second transistor,

first switching means controlled by said first and second transistors to selectively energize the start-up windings of the motor,

a limit switch responsive to a limit condition on the motor operation,

a lock-out circuit responsive to the actuation of the limit switch to inhibit conduction of the second transistor to prevent operation of the motor,

reset means to reset the lock-out circuit,

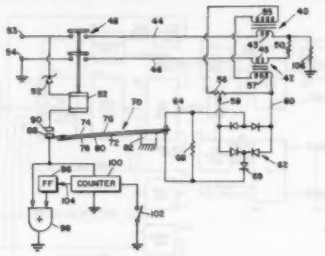
a time delay circuit actuated by the energization of the start-up motor windings by the first switching means, and

second switching means operated by the time delay circuit to energize the main motor windings after a predetermined time delay.

4,042,967
GROUND FAULT SENSOR

Yujiro Yamamoto, 1880 Park Newport, Newport Beach, Calif. 92660

Filed Oct. 28, 1975, Ser. No. 625,922
Int. Cl.² H02H 3/16
U.S. Cl. 361—45 13 Claims



1. A ground fault detector for connection in a pair of electrical power lines and comprising:

a switch connected in series in one of said lines;

actuating means in the form of a piezo-electric element of the kind that changes dimensions when subjected to an electric field for actuating said switch;

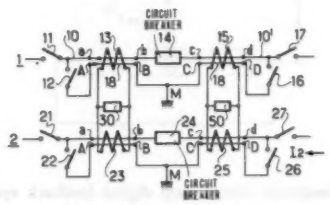
electrically chargeable means chargeable to create an electric field in said piezo-electric element sufficient for rendering said actuating means operable to actuate said switch; and

charging means responsive to differences between the electrical state of the lines of said pair of lines for charging said electrically chargeable means.

4,042,968
HIGH-VOLTAGE ELECTRICAL INSTALLATION

Georges Kypréos, Ste. Foy les Lyon, and Lucien Orgeret, Lyon, both of France, assignors to Delle-Alsthom, Villeurbanne, France

Filed Mar. 8, 1976, Ser. No. 664,638
Claims priority, application France, Mar. 14, 1975, 75.08648
Int. Cl.² H02H 3/26
U.S. Cl. 361—60 7 Claims

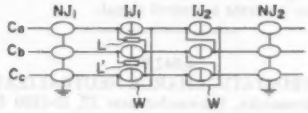


1. A multi-phase high-voltage electrical installation comprising, for each phase, at least two circuit fields, each field including, along a phase conductor, a circuit breaker arranged between first and second isolating switches; a first current transformer arranged between said first switch and said circuit breaker; a second current transformer arranged between said circuit breaker and said second switch; said first transformers of said circuit fields being connected to a first common load, said second transformers being connected to a second common load; a first ground isolator connected to said phase conductor between said first transformer and said first switch; a second ground isolator connected to said phase conductor between said second transformer and said second switch; wherein the magnetic circuit of each said current transformers, which are connected to the same load, is crossed simultaneously by said phase conductor of the circuit field to which that transformer belongs; and an auxiliary conductor connecting said ground isolator of the same circuit field at least temporarily to ground.

4,042,969
ELECTRIC CABLE POWER TRANSMISSION LINES

Teruji Nikaido, Ichihara; Kaoru Haga, Tokyo, and Yasutaka Fujiwara, Yokohama, all of Japan, assignors to Tokyo Electric Power Co. Ltd., Tokyo and Showa Electric Wire & Cable Co. Ltd., Kawasaki, both of, Japan

Filed June 26, 1975, Ser. No. 590,564
Claims priority, application Japan, June 27, 1974, 49-76379[U]
Int. Cl.² H02H 7/22
U.S. Cl. 361—107 9 Claims

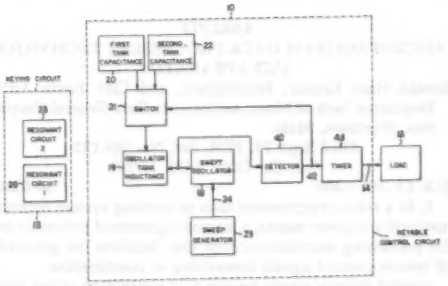


1. An electric cable power transmission line of the class wherein three phase metal sheath single core power cable sections are interconnected by junction boxes comprising, three single core power cables having metal sheaths, two sets of ordinary junction boxes each at opposite ends of a cable section, means for grounding each set of ordinary junction boxes, two sets of insulating junction boxes in each cable section between each set of ordinary junction boxes, cross-connecting wire means for connecting the metal sheaths of one power cable on one side of the insulating junction boxes to the metal sheaths of another power cable on the other side of the insulating junction boxes, thereby forming three loop circuits, each loop circuit including the grounding connections of the ordinary junction boxes, the metal sheaths of the cable sections, and the cross-connecting wire means, and no more than two saturable reactors, each connected in series with no more than two cross-connecting wire means thus providing no more than two loop circuits with saturable reactors.

4,042,970
DUAL FREQUENCY NARROW-BAND FREQUENCY MODULATED KEYABLE CONTROL CIRCUIT AND KEYING CIRCUIT THEREFOR

Carl E. Atkins, Montclair, N.J., assignor to Wagner Electric Corporation, Parsippany, N.J.

Filed Feb. 13, 1976, Ser. No. 657,760
Int. Cl.² E05B 49/00
U.S. Cl. 361—172 9 Claims



1. A keyable control circuit and keying circuit therefor comprising:

a. an rf oscillator operating at a first mean frequency;

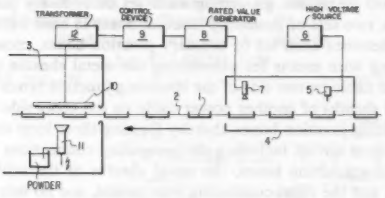
b. means for cyclically varying the frequency of said rf oscillator about its mean frequency;
c. means for producing a first signal each time said oscillator is swept past some frequency within said cyclic frequency variation about said first mean frequency;
d. means for detecting said first signal;
e. means, operative in response to detection of said first signal, for shifting the mean frequency of said rf oscillator to a second mean frequency, the magnitude of said mean frequency shift being greater than twice the peak-to-peak amplitude of said cyclic variation imposed on said first and second mean frequencies;
f. means for producing a second signal each time said oscillator is swept past some frequency within said cyclic frequency variation about said second mean frequency;
g. means for detecting said second signal; and
h. means operative in response to detection of said second signal to generate a control signal.

4,042,971

ELECTROSTATIC CHARGE NEUTRALIZATION

Hermann Brennecke, Schwambstrasse 37, D-6100 Darmstadt, and Horst Liere, Sandweg, D-6116 Eppertshausen, both of Germany

Continuation-in-part of Ser. No. 511,307, Sept. 30, 1974, abandoned. This application May 10, 1976, Ser. No. 684,555
Int. Cl.[2] H01T *19/00*
U.S. Cl. 361—213 **2 Claims**



1. In a process for applying, to a conductive workpiece arranged to move through a coating installation, a layer of material by spray means providing a spray of such material which is applied to the workpiece with the aid of an electrostatic field, the improvement comprising conducting electrostatic charges on the workpiece to ground, at least while such layer is being applied to the workpiece, by ionizing the air adjacent a portion of the workpiece by means of a discharging device maintained out of contact with the workpiece and disposed near the path of travel of the workpiece through the installation so that the effective range of the discharging device communicates with the workpiece while being outside of the spray range of the spray means.

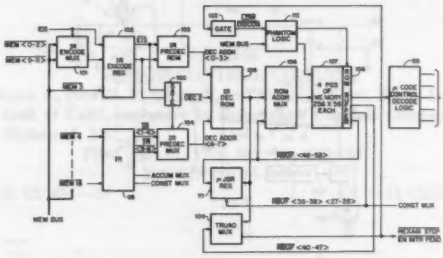
4,042,972

MICROPROGRAM DATA PROCESSING TECHNIQUE AND APPARATUS

Ronald Hans Gruner, Framingham, and Carl Justin Alsing, Hopkinton, both of Mass., assignors to Data General Corporation, Westboro, Mass.

Filed Sept. 25, 1974, Ser. No. 509,182
Int. Cl.[2] G06F *9/16, 13/00*
U.S. Cl. 364—200 **14 Claims**

1. In a microprogrammed data processing system including instruction register means, a microprogrammed processor used for processing microinstructions that facilitate the generation of system control signals comprising in combination:
control storage means having said microinstructions stored therein;
means for addressing said control storage means to select one of said microinstructions;
microinstructions decode means connected from said control storage means for deriving a set of decode control signals from said one of said microinstructions;
pre-decode ROM means, connected from said instruction register means for receiving a first group of signals from op code stored in said instruction register means and for providing one set of signals corresponding thereto;
pre-decode multiplexer means, connected from said instruction register means for receiving a second group of signals from said op code and for providing a second set of signals corresponding thereto; and
ROM decode means, connected directly from both said pre-decode ROM means and said pre-decode multiplexer means, for receiving said one set and said second set of signals and responsive thereto for controlling said addressing means.

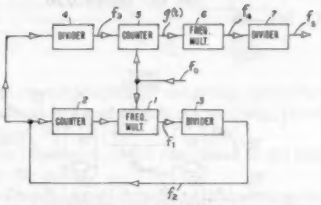


4,042,973

CLOSED LOOP FEEDBACK DIGITAL SYSTEM FOR EXPONENTIALLY VARYING SIGNAL FREQUENCY

Patrick J. Caulfield, Wayzata; Robert E. Diesch, Rogers, and Gerald R. Strunc, Maple Grove, all of Minn., assignors to Pako Corporation, Minneapolis, Minn.

Filed Apr. 5, 1976, Ser. No. 673,368
Int. Cl.[2] G06F *15/20;* **G01R** *23/02;* **H03K** *21/00*
U.S. Cl. 235—150.3 **3 Claims**



1. An electronic closed loop digital feedback system for producing square wave type output signal of essentially exponentially varying frequency from a constant frequency square wave type input signal, the system comprising:
first frequency multiplier means for generating a first signal, the frequency of which is equal to the frequency of the input signal multiplied by a first multiplication factor,
first frequency divider means for receiving the first signal and producing a second signal with a frequency directly proportional to the frequency of said first signal,
first counter means connected to the first frequency multiplier means for determining the first multiplication factor thereof, the first counter means being responsive to the cycles of the second signal, the frequency of the second signal increasing when the first counter means is being incremented and decreasing when the first counter means is being decremented,

second frequency divider means for receiving the second signal and producing a third signal of a frequency directly proportional to the frequency of the second signal,

second frequency multiplier means for receiving the input signal and generating an output signal of a frequency equal to the frequency of the input signal multiplied by a second multiplication factor, and

second counter means connected to the second frequency multiplier means for determining the second multiplication factor, the second counter means being responsive to the cycles of the third signal, the frequency of the output signal increasiing when the second counter means is being incremented and the first counter means is being decremented and decreasing when the second counter means is being decremented and the first counter means is being incremented.

DESIGN PATENTS

GRANTED AUGUST 16, 1977

ERRATA

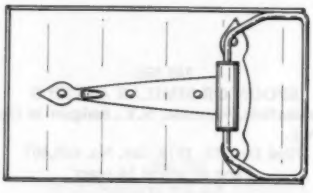
For CLASS	See PATENT NO.
013–001	245,432
014–028	245,433
024–017	245,434
024–054	245,451
024–041	245,452
028–018	245,453
028–051	245,459
028–046	245,460

DESIGNS

AUGUST 16, 1977

245,376
CHILD'S LIFE JACKET
Maurice H. O'Link, St. Cloud, Minn., assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Nov. 5, 1975, Ser. No. 628,947
Term of patent 14 years
Int. Cl. D2—*02*
U.S. Cl. D2—27

245,377
BELT BUCKLE
Paul A. Romano, Lane 1, Brookville, N.Y. 11753
Filed Mar. 22, 1976, Ser. No. 668,959
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—447

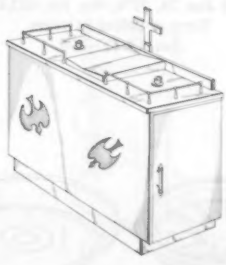


245,378
CHAIR
Hans Roericht, Ulm, Germany, assignor to Wilkhahn Wilkening & Hahne, Germany
Filed Nov. 19, 1975, Ser. No. 633,593
Claims priority, application Germany, June 6, 1975, 22368
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—31

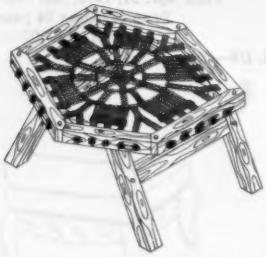
245,379
OTTOMAN
Lester Beall, Jr., High Point, N.C., assignor to Trend Line Furniture Corporation, Amsterdam, N.Y.
Filed Apr. 21, 1976, Ser. No. 678,835
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—36

245,380
ARM CHAIR
Henry Olko, Chicken Valley Road, Locust Valley, N.Y. 11560
Filed Nov. 7, 1975, Ser. No. 630,076
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—57

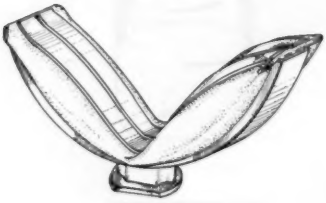
245,381
FAMILY PRAYER ALTAR
Ebert Lee Lilley, Rte. No. 1, Box 182, High Point, N.C. 27260
Filed Sept. 18, 1974, Ser. No. 506,975
Term of patent 14 years
Int. Cl. D31—*00*
U.S. Cl. D6—155



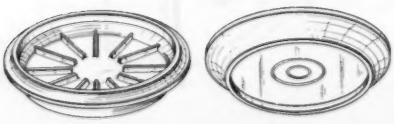
245,382
TABLE
Larry L. Hughes, 2923 Winter St., Fort Wayne, Ind. 46806; Don E. Lutz, 9314 Kress Road, Fort Wayne, Ind. 46809, and Mark A. Hade, R.R. No. 1, Grabill, Ind. 46741
Filed Feb. 27, 1976, Ser. No. 661,944
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—175



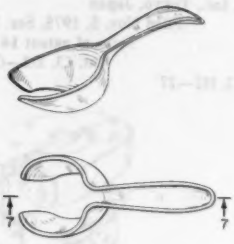
245,383
HOLDER FOR PHOTOGRAPHIC LENSES
George O. Stanley, Sunland, Calif., assignor to The Kalt Corporation, Santa Monica, Calif.
Filed Mar. 1, 1976, Ser. No. 662,424
Term of patent 7 years
Int. Cl. D6—*04*
U.S. Cl. D6—188



245,384
COMBINED COASTER AND COVER OR THE LIKE
Harold P. Ashton, Province, R.I., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Jan. 26, 1976, Ser. No. 652,455
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—45



245,385
EGG SCOOP OR THE LIKE
Harold P. Ashton, Providence, R.I., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed May 19, 1976, Ser. No. 687,959
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D7—104



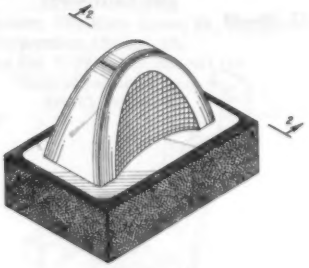
245,386
SPOON OR SIMILAR ARTICLE
Ellen B. Manderfield, Syracuse, N.Y., assignor to Oneida Ltd., Oneida, N.Y.
Filed Dec. 15, 1975, Ser. No. 640,407
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—137

245,387
FRUIT SCOOP OR THE LIKE
Roger P. Beauchamp, Harrisville, RI, assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Apr. 21, 1976, Ser. No. 678,841
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—149

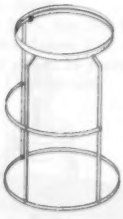
245,388
SPOON OR SIMILAR ARTICLE
Colin B. Richmond, II, Oneida, N.Y., assignor to Oneida Ltd., Oneida, N.Y.
Filed Dec. 15, 1975, Ser. No. 640,406
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—150

245,389
SPOON OR SIMILAR ARTICLE
Colin B. Richmond, II, Oneida, N.Y., assignor to Oneida Ltd., Oneida, N.Y.
Filed Dec. 15, 1975, Ser. No. 640,405
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—151

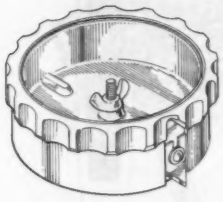
245,390
SCRUB SPONGE OR SIMILAR ARTICLE
Earl E. Hoyt, Ramsey, N.J., assignor to American Cyanamid Company, Stamford, Conn.
Filed July 28, 1976, Ser. No. 709,575
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—178



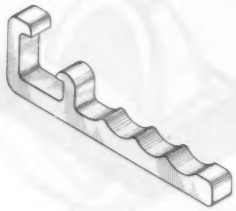
245,391
GARBAGE BAG HOLDER
Norman Thorpe, 616 S. Monroe St., Stoughton, Wis. 53589
Filed Feb. 26, 1976, Ser. No. 661,723
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—189



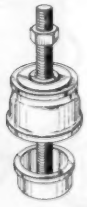
245,392
CARPET REPAIR TOOL
Hollis H. Bascom; John J. Greci, both of Livermore, and Merle R. Hoopengardner, Lafayette, all of Calif., assignors to Orcon Corporation, Union City, Calif.
Filed June 9, 1976, Ser. No. 694,214
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—15



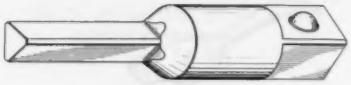
245,393
FOOD CARTON OPENER
Dean J. Madsen, 21 Middleridge Lane North, Rolling Hills, Calif. 90274; Robert G. Madsen, 6801 Lawn Haven Drive, Huntington Beach, Calif. 92648, and Gordon W. Nichols, 13241 Rutgers Ave., Downey, Calif. 90241
Filed Nov. 12, 1975, Ser. No. 630,978
Term of patent 14 years
Int. Cl. D7—*99*
U.S. Cl. D8—18



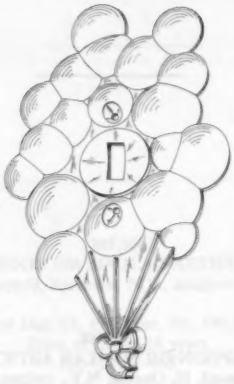
245,394
TOOL FOR PRESSING SICKLE BUSHINGS
Larry J. Knecht, P.O. Box G, Paola, Kans. 66071
Filed May 6, 1976, Ser. No. 683,890
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—51



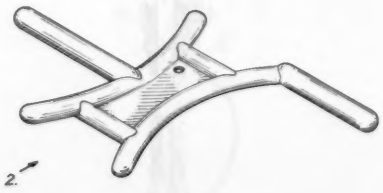
245,395
DRIVE ADAPTOR FOR SOCKETS OR THE LIKE
George Cognevich, 502 Moncla Ave., Belle Chasse, La. 70037
Filed June 14, 1976, Ser. No. 695,433
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—70



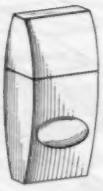
245,396
WALL PLATE
Joan Klatil Creamer, Warwick, R.I., assignor to General Electric Company
Filed Aug. 30, 1971, Ser. No. 502,300
Term of patent 14 years
Int. Cl. D8—*09*
U.S. Cl. D8—351



245,397
STRING REEL
Alfred D. Duncan, 792 Cambridge, Elmhurst, Ill. 60126
Filed Mar. 8, 1976, Ser. No. 664,746
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D8—359



245,398
BOTTLE OR SIMILAR ARTICLE
Adam J. Grodin, Forrest Hills, N.Y., assignor to American Cyanamid Company, Stamford, Conn.
Filed Apr. 24, 1975, Ser. No. 571,168
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—71

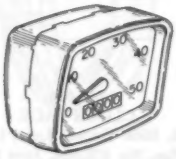


245,399
PACKAGING CONTAINER FOR LIGHT BULBS OR THE LIKE
Stephen F. Walker, Denver, Colo., assignor to Alan P. McGregor, Denver, Colo.
Filed Dec. 3, 1975, Ser. No. 637,150
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—183

245,400
WRISTWATCH CASE
Eiichi Osawa; Midori Miyata, both of Tokyo, and Susumu Karibe, Matsudo, all of Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan
Filed Aug. 7, 1975, Ser. No. 602,721
Claims priority, application Japan, Feb. 14, 1975, 50-6308
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D10—30

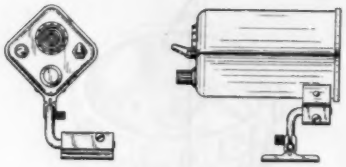
245,401
GAUGE FOR CHECKING THE HEIGHT OF TENNIS NETS
William L. Kahn, Sarasota, Fla., assignor to Net Check, Inc., Sarasota, Fla.
Filed May 13, 1976, Ser. No. 685,776
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—64

245,402
SPEEDOMETER
Howard J. Rasmussen, Fox River Grove, Ill., assignor to Stewart-Warner Corporation, Chicago, Ill.
Filed Jan. 7, 1976, Ser. No. 647,115
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—98

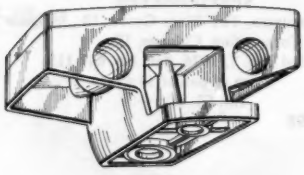


245,403
SPOKE-MOUNTED BICYCLE REFLECTOR
Yuzuru Kagayama, Osaka, Japan, assignor to Tsuyama Manufacturing Company, Ltd., Japan
Filed July 18, 1975, Ser. No. 597,386
Claims priority, application Japan, Jan. 24, 1975, 50-3362
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—111

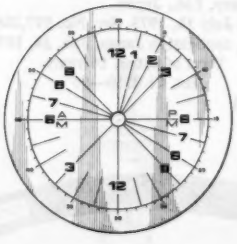
245,404
POLICE RADAR DETECTOR
James David Koncak, Dallas, and Joseph T. Spaits, Plano, both of Tex., assignors to Autotronics, Inc.
Filed July 28, 1976, Ser. No. 709,454
Term of patent 14 years
Int. Cl. D10—*05*
U.S. Cl. D10—116



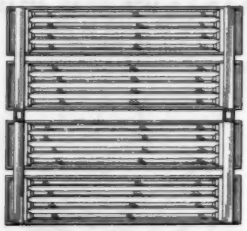
245,405
VEHICLE HORN
James J. Nelson, Toledo, Ohio, assignor to Midland-Ross Corporation, Cleveland, Ohio
Filed Mar. 23, 1976, Ser. No. 669,739
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—120



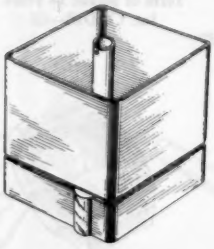
245,406
CLOCK FACE
Mayfield K. Webb, 5668 Thicket Lane, Columbia, Md. 21044
Continuation of Ser. No. 478,984, June 13, 1974, which is a continuation of Ser. No. 489,699, July 18, 1974, which is a continuation of Ser. No. 489,703, July 18, 1974, which is a continuation of Ser. No. 489,721, July 18, 1974. This application Aug. 21, 1975, Ser. No. 606,714
Term of patent 14 years
Int. Cl. D10—*07*
U.S. Cl. D10—126



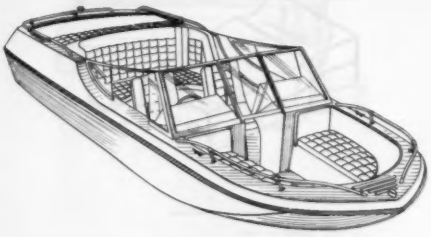
245,407
PLANT GROWTH APPARATUS
R. Louis Ware, 2108 Middle Fork Road, Northfield, Ill. 60093
Filed Oct. 2, 1975, Ser. No. 618,893
Term of patent 14 years
Int. Cl. D6—*06*; D11—*02*
U.S. Cl. D11—144



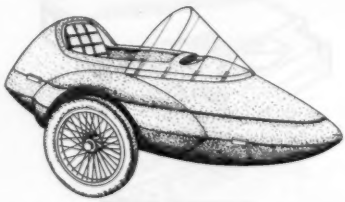
245,408
HYDRO-CULTURE CONTAINER
Gerhard Baumann, Bumpliz-Bern, and Heinz Gerber, Kirchberg, both of Switzerland, assignors to Interhydro AG, Bern, Switzerland
Filed Oct. 6, 1975, Ser. No. 620,190
Claims priority, application Switzerland, Apr. 9, 1975, 107680/75
Term of patent 14 years
Int. Cl. D11—*02*
U.S. Cl. D11—155



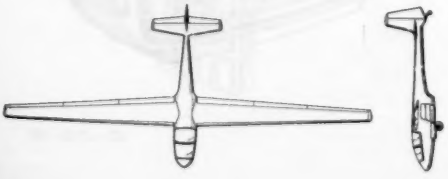
245,409
BOAT
James Bostic, Lansing, Mich.; Schuyler P. Brown, Jr., Treasure Island, Fla., and Emerson Purkapile, Chicago, Ill., assignors to Bangor Punta Operations, Inc., Greenwich, Conn.
Filed July 29, 1975, Ser. No. 600,039
Term of patent 14 years
Int. Cl. D12—*06*
U.S. Cl. D12—62



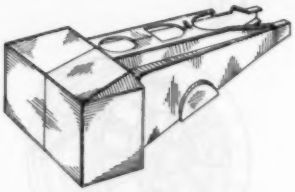
245,410
MOTORCYCLE SIDECAR
Thomas W. Kellogg, Newport Beach, Calif., assignor to Spirit of America, Incorporated, Gardena, Calif.
Filed Oct. 17, 1975, Ser. No. 623,423
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—116



245,411
MOTOR GLIDER
Kiyoshi Sohda, Yokohama, and Hisao Kitada, Yokosuka, both of Japan, assignors to Japan Aircraft Manufacturing Co., Ltd., Yokohama, Japan
Filed Oct. 18, 1976, Ser. No. 733,148
Term of patent 14 years
Int. Cl. D12—*07*
U.S. Cl. D12—71

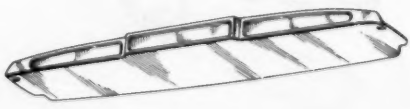


245,412
COVER FOR ELECTRIC BICYCLE MOTOR AND BATTERY
Lawrence L. Ray, San Jose, Calif., assignor to Bolt Vehicles, Inc., Palo Alto, Calif.
Filed Sept. 11, 1975, Ser. No. 612,235
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—126

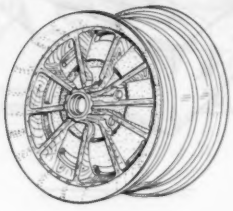


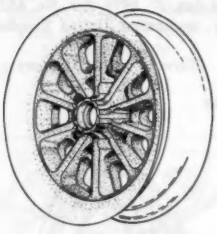
245,413
TIRE FOR A VEHICLE WHEEL
David Lyndon Buck, Sutton Coldfield, England, assignor to Dunlop Limited, London, England
Filed Jan. 27, 1976, Ser. No. 652,850
Claims priority, application United Kingdom, Aug. 2, 1975, 972058/75
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—145

245,414
OVERHEAD CONSOLE FOR VANS
Fredrick A. Ashbaugh, 302 Prairie Lane, Belton, Mo. 64012, and Rodney L. Wickwar, 12734 Overhill Ave., Grandview, Mo. 64030
Filed Mar. 4, 1976, Ser. No. 663,719
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—155

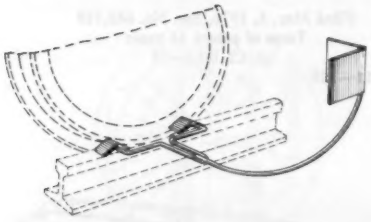


245,415
WHEEL
Millard Fillmore Harty, Jr., Bloomfield Hills, Mich., assignor to Motor Wheel Corporation, Lansing, Mich.
Division of Ser. No. 381,177, July 20, 1973, Pat. No. Des. 239,268, which is a continuation-in-part of Ser. No. 140,014, May 3, 1971, abandoned. This application Feb. 19, 1976, Ser. No. 659,546
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—209

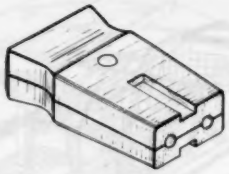




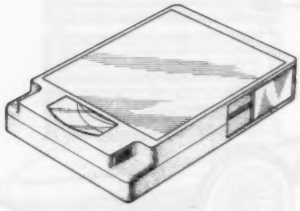
245,416
COMBINED WHEEL CHOCK AND FLAG
Robert Ray Carpenter, Gastonia, N.C., assignor to Uniroyal, Inc.
Filed June 21, 1976, Ser. No. 692,603
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—217



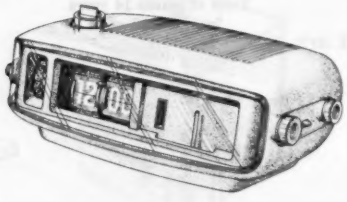
245,417
ELECTRICAL PLUG
William J. Kneller, Jay-Cee Industrial Park bldg. 8, Fox Drive & Main St., Tullytown, Pa. 19007
Filed May 10, 1976, Ser. No. 684,856
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D13—28



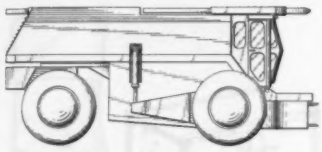
245,418
VIDEO TAPE RECORDER CARTRIDGE
Masaharu Katayama, and Hideo Takahashi, both of Saijo, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed Mar. 2, 1976, Ser. No. 663,026
Claims priority, application Japan, Sept. 3, 1975, 50-36013
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—6

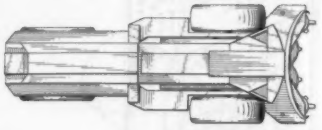


245,419
DIGITAL CLOCK RADIO
Isshin Miyamoto, Fukuoka, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan
Filed July 29, 1975, Ser. No. 600,025
Claims priority, application Japan, Feb. 20, 1975, 50-6903
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—73



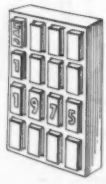
245,420
CHIPPING COMBINE
Walter H. Maucher, Rte. No. 2, Postal Rte. Box 146, Cantonment, Fla. 32533
Filed Jan. 26, 1976, Ser. No. 652,502
Term of patent 14 years
Int. Cl. D15—*03*
U.S. Cl. D15—26





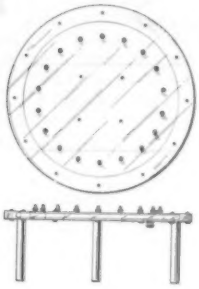
245,421
LIQUOR DISPENSER
George W. Bayers, Jr., 152 Del Mar Circle, Aurora, Colo. 80011
Filed Sept. 2, 1975, Ser. No. 609,396
Term of patent 14 years
Int. Cl. D15—*08*
U.S. Cl. D15—115

245,422
BLOCK CALENDAR
Philip K. Vanderhyden, Jr., 925 N. Bluemound Drive, Appleton, Wis. 54911
Filed Mar. 27, 1975, Ser. No. 562,570
Term of patent 14 years
Int. Cl. D19—*03*
U.S. Cl. D19—25

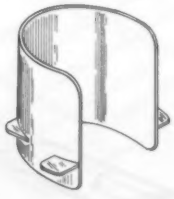


245,423
GROUND SUPPORTED FISHING POLE SUPPORT
Oscar N. Tentler, 409 Arlington Road, Newton Falls, Ohio 44444
Filed July 26, 1976, Ser. No. 708,567
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—13

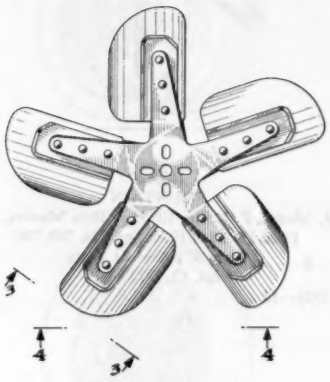
245,424
FOUNTAIN
Charles A. Mount, P.O. Box 10333, Wilton Manors, Fla. 33305
Filed Dec. 10, 1976, Ser. No. 749,708
Term of patent 3½ years
Int. Cl. D23—*01*
U.S. Cl. D23—13



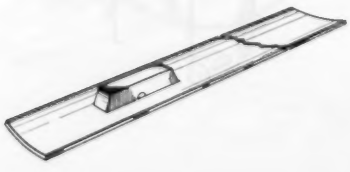
245,425
URINAL SHIELD FOR TOILET SEATS
Sterling Le Roy Annis, 4026 Sacramento St., Concord, Calif. 94521
Filed Dec. 1, 1976, Ser. No. 746,384
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—69



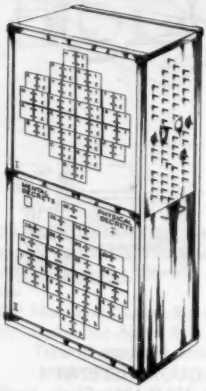
245,426
FAN
Bern M. Bonifant, Tacoma, Wash., assignor to Flex-A-Lite Corporation, Tacoma, Wash.
Filed Apr. 7, 1975, Ser. No. 565,391
The portion of the term of this patent subsequent to Mar. 18, 1989, has been disclaimed.
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—165

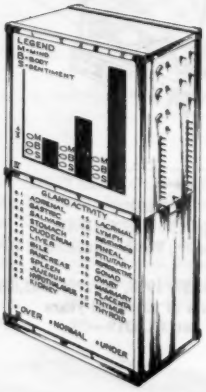


245,427
WHEELED PADDLE FOR USE IN FURNACE HEAT TREATING OF ARTICLES
John Kudla, Colonia, N.J., assignor to Codi Corporation, Fair Lawn, N.J.
Filed Mar. 10, 1976, Ser. No. 665,517
Term of patent 14 years
Int. Cl. D23—*99*
U.S. Cl. D23—167

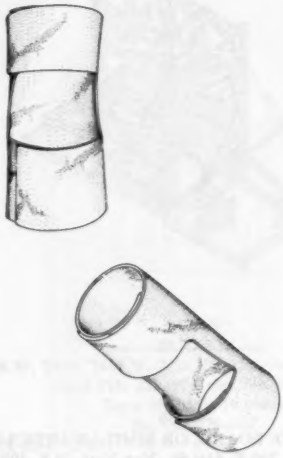


245,428
CABINET FOR DISPLAYING THE RESULTS OF BEHAVIORAL AND BIOLOGICAL EVALUATION
Peter Campione, 2026 Fairmount Ave., Philadelphia, Pa. 19130
Filed Apr. 19, 1976, Ser. No. 678,022
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—17

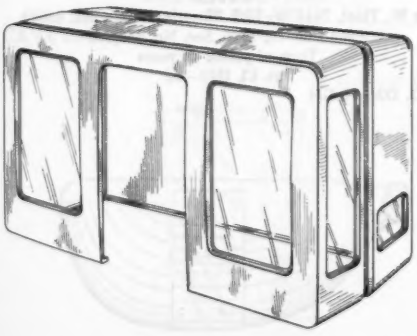




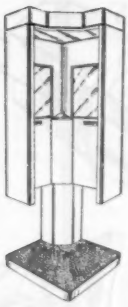
245,429
ORTHOPEDIC BRACE
Elmer M. Arluck, New York, N.Y., assignor to Thermo-Mold Medical Products, Inc., New York, N.Y.
Filed July 29, 1975, Ser. No. 600,081
Term of patent 14 years
Int. Cl. D24—*04;* D21—*02*
U.S. Cl. D24—64



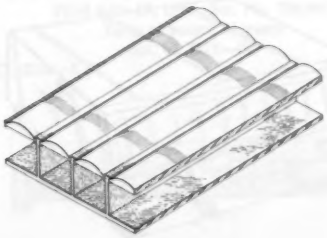
245,430
PASSENGER SHELTER
Peter J. Commins, Suite 304, 47 Colborne St., Toronto, Ontario, Canada (M5E 1E3)
Filed Mar. 22, 1976, Ser. No. 669,300
Term of patent 3½ years
Int. Cl. D25—*99*
U.S. Cl. D25—1



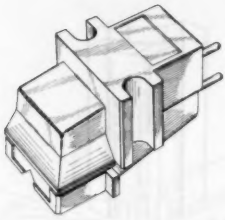
245,431
TELEPHONE BOOTH
Edward Kent, Hatfield, England, assignor to The Post Office, London, England
Filed Aug. 4, 1976, Ser. No. 711,531
Term of patent 14 years
Int. Cl. D25—*99*
U.S. Cl. D25—16

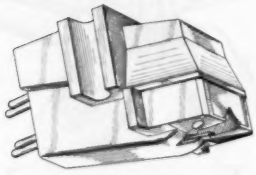


245,432
INTERCHANGEABLE ONE DIMENSIONAL CONVERGENCE LENS SOLAR RADIATION INTENSIFICATION PLATE
Will Clarke England, 7310 Eastcrest Drive, Austin, Tex. 78752
Filed Dec. 1, 1975, Ser. No. 636,520
Term of patent 14 years
Int. Cl. D13—*02*
U.S. Cl. D13—1

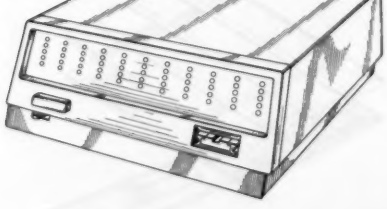


245,433
PHONOGRAPH CARTRIDGE
James P. Thomsen, Mount Prospect, and Ronald G. Theilmann, Arlington Heights, both of Ill., assignors to Shure Brothers Incorporated
Filed Sept. 2, 1976, Ser. No. 719,966
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D14—28

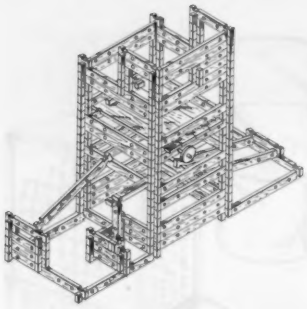




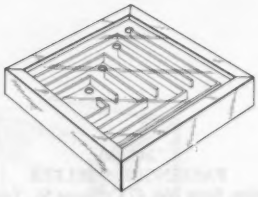
245,434
REAGENT STRIP REFLECTANCE PHOTOMETER
Glenn S. Beidler, and Kenneth D. Collister, both of Elkhart, Ind., assignors to Miles Laboratories, Inc., Elkhart, Ind.
Filed Aug. 10, 1976, Ser. No. 713,293
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—17



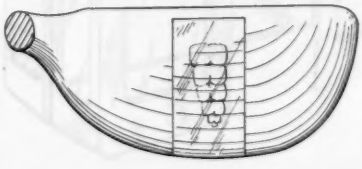
245,435
RECREATIONAL STRUCTURE
Charles H. Gnehm, 2707 68th SE., Mercer Island, Wash. 98040
Filed Oct. 6, 1975, Ser. No. 619,829
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 H



245,436
MAZE GAME BOARD, OR SIMILAR ARTICLE
Harry Zelenko, 240 E. 61st St., New York, N.Y. 10021
Filed Nov. 3, 1975, Ser. No. 627,951
Term of patent 7 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 KK

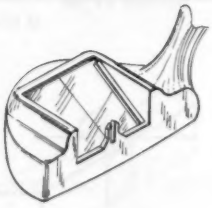


245,437
PUTTER
Joseph W. Thiel, 7416 W. 74th Place, Arvada, Colo. 80003
Filed Feb. 17, 1976, Ser. No. 658,166
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH

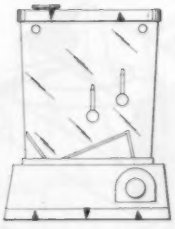


245,438
DETACHABLE SIGHTING MIRROR FOR GOLF PUTTERS
Joseph W. Thiel, 7416 W. 74th Place, Arvada, Colo. 80003
Filed Feb. 17, 1976, Ser. No. 658,274
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 CB

245,439
PUTTER
Joseph W. Thiel, 7416 W. 74th Place, Arvada, Colo. 80003
Filed Feb. 23, 1976, Ser. No. 660,159
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GC



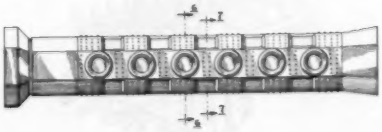
245,440
WATER GAME CASE
Shizuka Kojima, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Mar. 12, 1976, Ser. No. 666,483
Claims priority, application Japan, Dec. 12, 1975, 50-49254
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 JJ



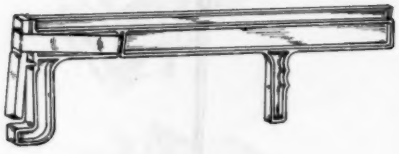
245,441
GOLF PUTTER
Marvin G. Middlestadt, 2843 Northville Drive, Grand Rapids, Mich. 49505
Filed Mar. 26, 1976, Ser. No. 671,012
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GC

245,442
GOLF PUTTER HEAD
Jerome E. Becker, 3285 Woodbine, Los Angeles, Calif. 90064
Filed May 19, 1976, Ser. No. 687,651
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 GH

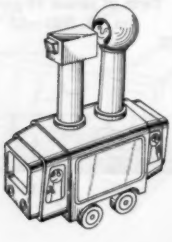
245,443
HAND GRIP FOR A TENNIS RACKET
Alvin H. Sweet, 5168-B Wood St., South Gate, Calif. 90280
Filed July 19, 1976, Ser. No. 706,467
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 ST



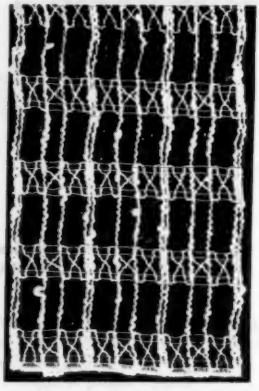
245,444
TOY RIFLE
Robert William Hotchkiss, 8861 W. Albain Road, Ida, Mich. 48140
Filed Aug. 20, 1974, Ser. No. 499,056
Term of patent 7 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 TT



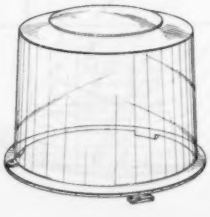
245,445
TOY CAMERA TRUCK
Matthew A. Moustakas, Mercerville, N.J., assignor to CBS Inc., New York, N.Y.
Filed Mar. 1, 1976, Ser. No. 662,478
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AJ



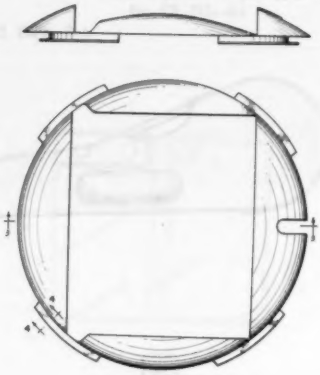
245,446
CURTAIN MATERIAL
Peter E. Schroeder, Lucerne, Switzerland, assignor to Gardisette International AG, Lucerne, Switzerland
Filed May 28, 1975, Ser. No. 581,557
Claims priority, application Germany, Dec. 5, 1974, 806
Term of patent 14 years
Int. Cl. D5—*05*
U.S. Cl. D47—6 D



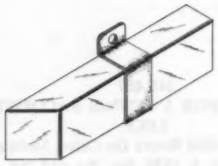
245,447
LENS FOR A REVOLVING LAMP
Peter E. Brudy, 111 Angus Drive, Willowdale, Ontario, Canada, and John Smith, 381 Shirley Road, Southampton, England (S09 1HB)
Filed July 23, 1974, Ser. No. 491,003
Claims priority, application Canada, Jan. 24, 1974, 45645
Term of patent 14 years
Int. Cl. D26—*06*
U.S. Cl. D48—32 A



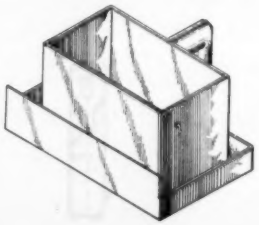
245,448
SHIELD FOR AN AUTOMOBILE HEADLIGHT
Herbert L. Babcock, 8005 Postal Way, Okolona, Ky. 40219
Filed Sept. 8, 1975, Ser. No. 611,159
Term of patent 14 years
Int. Cl. D26—*06*
U.S. Cl. D48—32 C



245,449
TRAILER LIGHT INDICATOR
Richard J. Wright, 7054 Bothwell Road, Reseda, Calif. 91335
Filed Nov. 28, 1975, Ser. No. 635,960
Term of patent 14 years
Int. Cl. D26—*06*
U.S. Cl. D48—32 D



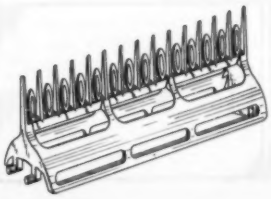
245,450
PAINT CONTAINER
Joseph J. Donlon, 1240 Dauphine St., New Orleans, La. 70116
Filed June 8, 1976, Ser. No. 693,914
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D64—18



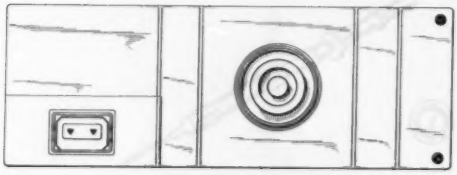
245,451
CATHETER
Ronald W. Wortley, Salt Lake City, Utah, assignor to Vital Assists, Inc.
Filed Sept. 24, 1975, Ser. No. 616,282
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D24—54

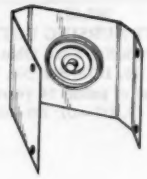
245,452
INFANT NURSING BOTTLE
Paul K. Meeker, 412 Park St., Kent, Ohio 44240
Filed Aug. 16, 1976, Ser. No. 714,528
Term of patent 14 years
Int. Cl. D7—*01*; D9—*01*
U.S. Cl. D83—8 A

245,453
HAIR STYLER ATTACHMENT
Morison S. Cousins, Plainview; Michael A. Cousins, Huntington, both of N.Y., and Greydon A. Rhodes, III, Noroton, Conn., assignors to The Gillette Company, Boston, Mass.
Filed Feb. 23, 1976, Ser. No. 660,621
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D26—18

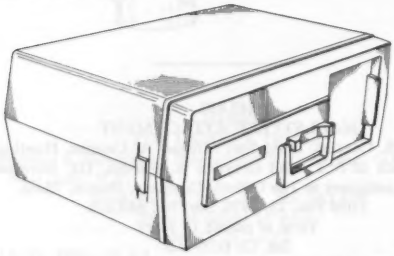


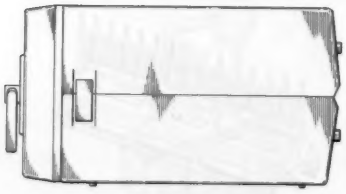
245,454
AUDIO-VISUAL STORAGE CASE
Irene B. Feingold, and Stanley Z. Feingold, both of 420 Pitts Colony Drive, Rochester, N.Y. 14623
Filed Nov. 14, 1975, Ser. No. 632,064
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 D



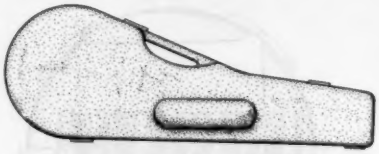


245,455
PORTABLE ENCLOSURE FOR ELECTRONIC EQUIPMENT
Wayne Carl Cathey, Bedford, Tex., assignor to Xerox Corporation, Stamford, Conn.
Filed Nov. 20, 1975, Ser. No. 633,721
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R

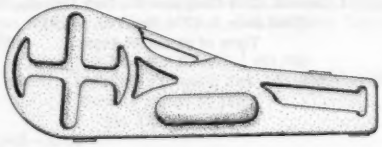




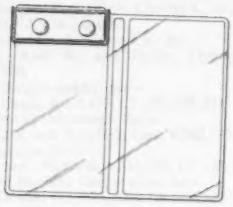
245,456
CARRYING CASE FOR A TENNIS RACQUET OR THE LIKE
Carl Elwood Barrett, 3500 Rivere Du Chien, Mobile, Ala. 36619
Filed Feb. 6, 1976, Ser. No. 655,700
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R



245,457
CARRYING CASE FOR A TENNIS RACQUET OR THE LIKE
Carl Elwood Barrett, 3500 Rivere Du Chien, Mobile, Ala. 36619
Filed Feb. 6, 1976, Ser. No. 655,765
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R

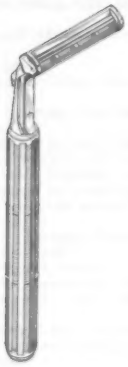


245,458
CARD CASE
Winfried Josepf Paul Hauss, Kaiserring 46, 68 Mannheim 1, and Andre Christian Haas, Saarlandstrasse 1, 6806 Viernheim, both of Germany
Filed Oct. 29, 1975, Ser. No. 626,866
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—3 A



245,459
COMBINED ELECTRIC SHAVER AND COVER THEREFOR
Shima Ito, Osaka, Japan, assignor to Matsushita Electric Works, Ltd., Kadoma, Japan
Filed Mar. 3, 1976, Ser. No. 663,602
Claims priority, application Japan, Dec. 16, 1975, 50-49858
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—51

245,460
RAZOR
Norman D. Poisson, Andover, Mass., assignor to The Gillette Company, Boston, Mass.
Filed Mar. 11, 1976, Ser. No. 666,168
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—46



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 16TH DAY OF AUGUST, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. Ahlstrom Osakeyhtio: *See*—
Arhippainen, Bengt; and Gullichsen, Johan, 4,042,452, Cl. 162-60.000.

A. Christiaens Societe Anonyme: *See*—
Delarge, Jacques E.; Lapiere, Charles L.; and Georges, Andre H., 4,042,693, Cl. 424-246.000.

A. W. Anderberg Manufacturing Co.: *See*—
Anderberg, Axel W.; and Taylor, George A., 4,042,266, Cl. 292-267.000.

AB Metall- & Bergprodukter: *See*—
Lindgren, Osten, 4,042,473, Cl. 204-109.000.

AB Svenska Dental Instrument: *See*—
Ekman, Bjorn; and Tyrefors, Lars, 4,042,170, Cl. 229-62.500.

Abbott Laboratories: *See*—
Genese, Joseph Nicholas, 4,041,934, Cl. 128-2.00F.

ABC Packaging Machine Corporation: *See*—
Reichert, Donald G., 4,041,850, Cl. 93-53.00M.

Abdou, Mohamed: *See*—
Buchta, Karl; Abdou, Mohamed; and Woltersdorf, Harald, 4,042,733, Cl. 427-391.000.

Abe, Akira, to Shin-Etsu Chemical Co., Ltd. Water-soluble defoaming agents. 4,042,528, Cl. 252-358.000.

Abe, Michio; and Maeda, Naoyuki, to Tokai TRW & Co. Ltd. System and device for the ignition of an internal combustion engine using a lean air-fuel mixture. 4,041,922, Cl. 123-191.00S.

Abe, Mitsuo; Nagata, Masaki; and Kikuchi, Masafumi, to Japan Synthetic Rubber Company Limited. Highly weather-resistant, thermoformable sheeting. 4,042,548, Cl. 260-23.0XA.

Abelson, Paul N.; Buell, Halsey W.; and Hallatt, William E., to Carborundum Company, The. Abrasion resistant coated abrasive pipe lining sheet. 4,042,559, Cl. 260-38.000.

Abratis, Horst: *See*—
Langhammer, Hans Jurgen; Abratis, Horst; Schafer, Klaus; Rendel, Klaus-Jurgen; and Lotze, Horst, 4,042,223, Cl. 266-47.000.

ABU Aktiebolag: *See*—
Moosberg, Borje Sigurd, 4,042,186, Cl. 242-84.420.

Accusort Corporation: *See*—
Arild, Tor; and Ames, Russell R., 4,042,114, Cl. 209-111.70R.

ACF Industries, Incorporated: *See*—
Peters, Clifford M., 4,041,970, Cl. 137-102.000.

Acheson Industries, Inc.: *See*—
Wolfe, Eugene Earl; and Heath, Allan Burkett, 4,041,899, Cl. 118-323.000.

Acheson, Richard M.; Stubbs, John K.; Baxter, Charles A. R.; and Kuhla, Donald E., to Pfizer Inc. Imidazo[2,1-b]thiazole and thiazolo[3,2-a]-benzimidazole quaternary salts as hypoglycemic agents and growth promotants. 4,042,583, Cl. 542-458.000.

Ackermann, Rolf; Morlock, Gerhard; and Stehlik, Gerhard, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Iodophor solution containing glycide polymer. 4,042,525, Cl. 252-106.000.

Ackley, George Nelson, to AMP Incorporated. Method of terminating an electrical wire in an insulating housing. 4,041,604, Cl. 29-628.000.

Acomb, Byron Hillen; and Dolida, Roger Joseph, to Union Carbide Corporation. Apparatus for controlling the volumetric ratio between mixed gases. 4,041,969, Cl. 137-88.000.

Adam, Arlette, born Chosson: *See*—
Ciorbaru, Rita, born Sfartz; Adam, Arlette, born Chosson; Petit, Jean-Francois; Lederer, Edgar; Damais, Chantal, born Rousselot; Chedid, Louis; and Bona, Constantin, 4,042,678, Cl. 424-12.000.

Adamovske Strojirny, narodni podnik: *See*—
Jiruse, Jaroslav, 4,041,862, Cl. 101-218.000.

Ade, Frank, to Ciba-Geigy AG. Cascade coater. 4,041,897, Cl. 118-300.000.

Adolph Coors Company: *See*—
Brossia, Charles Edward, 4,042,127, Cl. 214-10.50R.

Adolphi, Heinrich: *See*—
Kiehs, Karl; Adolphi, Heinrich; and Huber, Rolf, 4,042,691, Cl. 424-200.000.

Advanced Micro Devices, Inc.: *See*—
Price, William Louis, 4,042,950, Cl. 357-51.000.

Affiliated Medical Research, Inc.: *See*—
Gadekar, Shreekrishna M., 4,042,699, Cl. 424-263.000.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See*—
Ciorbaru, Rita, born Sfartz; Adam, Arlette, born Chosson; Petit, Jean-Francois; Lederer, Edgar; Damais, Chantal, born Rousselot; Chedid, Louis; and Bona, Constantin, 4,042,678, Cl. 424-12.000.

AGFA-Gevaert, A.G.: *See*—
Feneberg, Paul, 4,042,652, Cl. 264-1.000.
Heidrich, Gunter; and Gotze, Christian, 4,042,301, Cl. 355-75.000.

AGFA-GEVAERT N.V.: *See*—
Dierckx, Peter Gerard, 4,041,882, Cl. 110-7.00B.
Moelants, Felix Jan; Dierckx, Jozef Aime; and Depoorter, Henri, 4,042,397, Cl. 96-84.00R.

Ahr, Robert L.; and Rhodes, Philip H., to Emery Industries, Inc. Improve stabilizers for vinyl halide resins containing a metal halide and an ethoxylated alkylphenol. 4,042,549, Cl. 260-23.0XA.

Ahrens, Hanns; Koch, Henning; Schroder, Eberhard; Biere, Helmut; and Kapp, Joachim-Friedrich, to Schering Aktiengesellschaft. Novel anti-inflammatory pyrazole derivatives and preparation thereof. 4,042,706, Cl. 424-273.00P.

Aikawa, Kazuo: *See*—
Hasegawa, Mutsuo; Aikawa, Kazuo; and Hayashi, Shinji, 4,042,468, Cl. 204-42.000.
Hasegawa, Mutsuo; Imaoka, Toshikazu; and Aikawa, Kazuo, 4,042,469, Cl. 204-42.000.
Hasegawa, Mutsuo; Aikawa, Kazuo; and Nagata, Katsuyuki, 4,042,471, Cl. 204-58.000.

Aikoh Co., Ltd.: *See*—
Ito, Haruo, 4,042,410, Cl. 106-117.000.
Matsuyama, Shigeru, 4,042,206, Cl. 249-197.000.

Aioi Seiki Kabushiki Kaisha: *See*—
Yonezawa, Keitaro, 4,042,311, Cl. 417-401.000.

Airco, Inc.: *See*—
Shrader, Robert L., 4,042,128, Cl. 214-17.00B.

Aitken, Donald F.: *See*—
Powell, David B.; Castonguay, Roger N.; and Aitken, Donald F., 4,042,896, Cl. 335-17.000.

Ajioka, James S.; and Tsuda, George I., to Hughes Aircraft Company. Wideband multiplexing antenna feed employing cavity backed wing dipoles. 4,042,935, Cl. 343-795.000.

Akimoto, Masao, to Yokohama Rubber Company Ltd., The. Dynamic absorber with pneumatic springs. 4,042,230, Cl. 267-136.000.

Aksamit, Steve M.: *See*—
Duncan, Leroy A.; and Aksamit, Steve M., 4,042,113, Cl. 209-74.00R.

Aktiebolaget Electrolux: *See*—
Gustavsson, John Kenneth Crister, 4,041,858, Cl. 100-229.00A.

Aktiebolaget Tudor: *See*—
Sundberg, Erik; and Westberg, Erik, 4,042,436, Cl. 156-182.000.

Akutagawa, Shigeru: *See*—
Miyake, Kenji; Kumon, Hiroshi; Zitukane, Yoshimaru; and Akutagawa, Shigeru, 4,042,385, Cl. 75-224.000.

Akyuerek, Altan; and Meyer, Eckhard, to BBC Brown, Boveri & Company, Limited. Method of producing semiconductor components and strip for carrying out the method. 4,041,602, Cl. 29-588.000.

Akzona Incorporated: *See*—
Corbin, Thomas F., Jr.; Eskridge, Brewster B.; and Lyon, Boyce M., 4,042,662, Cl. 264-210.00F.

Albanese, Damian F.; O'Farrell, Frank J.; Hammers, David E.; and Kennedy, Henry R., to International Telephone and Telegraph Corporation. Pseudo-random code (PRC) surveilance radar. 4,042,925, Cl. 343-14.000.

Alberny, Robert; and Vedda, Louis, to Institut de Recherches de la Siderurgie Francaise. Continuous-casting mold with electromagnet. 4,042,008, Cl. 164-147.000.

Album Frames Inc.: *See*—
Holbrook, R. Patrick, 4,041,630, Cl. 40-152.100.

Alcanzare, Eduardo V. Reversible window. 4,041,644, Cl. 49-163.000.

All American Industries, Inc.: *See*—
Doolittle, Donald B.; and Deshay, Harry W., 4,042,079, Cl. 188-290.000.

Allan, Donald S.; and Schiff, Daniel, to Arthur D. Little, Inc. Temperature-sensitive detector. 4,041,771, Cl. 73-40.50R.

Allen, Archelaius Dawson, to Gullick Dobson Limited. Mine roof supports. 4,041,714, Cl. 61-45.00D.

Allen, Gordon L. Automobile hitch coupler aid. 4,042,254, Cl. 280-478.00B.

Allen & Hanburys Limited: *See*—
Garside, Peter; and Dimsdale, Michael John, 4,042,697, Cl. 424-258.000.

Allen, Joseph C.; and Woodward, Charles D., to Texaco Inc. Recovery of petroleum from viscous asphaltic petroleum containing formations including tar sand deposits. 4,042,027, Cl. 166-260.000.

Allen, Mort M.: *See*—
Hopp, Philip; and Allen, Mort M., 4,041,629, Cl. 40-130.00R.

Allied Chemical Corporation: *See*—
Nychka, Henry R.; Eibeck, Richard E.; and Li, Chien C., 4,042,524, Cl. 252-69.000.
Tuller, Harold W.; and Nussbaum, Ralph W., 4,042,550, Cl. 260-280.00P.

Allis-Chalmers Corporation: *See*—
Hoepfl, Joseph R.; and Ballendux, Gerardus M., 4,041,972, Cl. 137-269.000.
Sieren, Gerald E.; and Musser, Earl C., 4,042,053, Cl. 180-51.000.

Alpha, Homer G.: *See*—
Niehaus, Howard E.; Hass, Winfield M.; Alpha, Homer G.; Hall, Sidney B.; and Traenkner, Frederick O., 4,042,227, Cl. 266-93.000.

Alsing, Carl Justin: *See*—
Gruner, Ronald Hans; and Alsing, Carl Justin, 4,042,972, Cl. 364-200.000.

Alsobrook, Clarence B., to Goodyear Tire & Rubber Company, The. Motorcycle tire. 4,042,002, Cl. 152-354.000.

Alter, David L. Screen printing frame with floating stretch-clamps. 4,041,861, Cl. 101-128.400.

Altes, Richard A., to ESL Incorporated. Technique of characterizing the nature of a radiation path transfer function by a few constants. 4,042,928, Cl. 343-5.0SA.

Aluminum Plumbing Fixture Corporation: *See*—
Ringler, Robin L., 4,041,557, Cl. 4-75.000.

Amano, Shin; and Tanga, Takeshi, to Koito Seisakusho Co., Ltd. Apparatus for safety and detection of illuminating circuit. 4,042,908, Cl. 340-46.000.

Amelect Incorporated: *See*—
Marshino, James B., 4,041,692, Cl. 58-50.00R.

American Can Company: *See*—
Sieverin, Walter J., 4,042,877, Cl. 324-37.000.

American Hospital Supply Corporation: *See*—
Dougan, Ramon C.; and Rudtke, Helen T., 4,041,942, Cl. 128-132.00D.
Moore, Robert R.; and Eitzen, Vincent E., 4,042,218, Cl. 259-72.000.

American Optical Corporation: *See*—
Krohn, David A.; Graf, Robert E.; and Deeg, Emil W., 4,042,405, Cl. 106-52.000.

Ames, Kenneth R., to Frontier Machinery Company. Articulating pipe coupling and alignment control assembly for center pivot irrigation system. 4,041,975, Cl. 137-344.000.

Ames, Russell R.: *See*—
Arild, Tor; and Ames, Russell R., 4,042,114, Cl. 209-111.70R.

AMF Incorporated: *See*—
Garrone, Franco, 4,041,959, Cl. 131-84.00B.

Amoco Production Company: *See*—
Palm, John W., 4,042,340, Cl. 23-262.000.

Amodeo, Guy Thomas. Antenna anchor for automobiles. 4,042,932, Cl. 343-715.000.

Amos, Robert Walter James: *See*—
Drake, Cyril Francis; and Amos, Robert Walter James, 4,042,402, Cl. 106-15.00R.

AMP Incorporated: *See*—
Ackley, George Nelson, 4,041,604, Cl. 29-628.000.
Villazon, Francisco, 4,041,740, Cl. 72-410.000.

Amron Corporation: *See*—
Rayle, Roy E.; Brey, Robert J.; and Woodruff, Wilbur John, 4,041,868, Cl. 102-43.00F.

Anbar, Michael. Method and apparatus for electrochemical generation of power from hydrogen. 4,042,755, Cl. 429-16.000.

Anderberg, Axel W.; and Taylor, George A., to A. W. Anderberg Manufacturing Co. Extensible safety latch means for pivotable windows. 4,042,266, Cl. 292-267.000.

Anderson Bros. Mfg. Co.: *See*—
Reid, Laurie M., 4,041,674, Cl. 53-61.000.
Reid, Laurie M., 4,041,677, Cl. 53-159.000.

Anderson, Buddy W.; Bowles, Bobby K.; Murphey, Joseph R.; Totty, Kenneth D.; and Young, Bill M., to Halliburton Company. Methods of consolidating incompetent subterranean formations using aqueous treating solutions. 4,042,032, Cl. 166-276.000.

Anderson, John Erling, to Union Carbide Corporation. Process for conversion of solid refuse to fuel gas using pelletized refuse feed. 4,042,345, Cl. 48-209.000.

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Anderson, Ralph. Device for preventing ice formation on a roof. 4,041,656, Cl. 52-16.000.

Anderson, Richard Marlow. Snowshoe and method of fabricating same. 4,041,621, Cl. 36-122.000.

Anderson, Robert L., to Fischel, Halbert. Liquid degasifier system and method. 4,042,351, Cl. 55-52.000.

Anderson, Roy E.; Brisken, Alex F.; and Lewis, James R., to United States of America, National Aeronautics and Space Administration. Automatic transponder. 4,042,926, Cl. 343-17.700.

Anderson, Victor F., to Shell Oil Company. Integrated shoe sole and heel. 4,041,620, Cl. 36-32.00R.

Anderson, Warren A. Mechanism of improving the regulation of rotary power sources subject to intermittent short term overload. 4,041,801, Cl. 74-572.000.

Andersson, Bengt Ivar, to C. J. Wennberg AB. Method of continuous and discontinuous electrochemical cleaning of alloyed steel with surfaces contaminated with mineral oils and synthetic oils. 4,042,477, Cl. 204/145R.

Ando, Shimon, to Hitachi, Ltd. Automatic welding apparatus. 4,042,161, Cl. 228-102.000.

Andrianov, Kuzma Andrianovich; Topchiashvili, Mikhail Izmailovich; Khananashvili, Lotary Mikhailovich; Pagava, Dali Georgievna; and Shermazanashvili, Nikolai Alexandrovich. Conducting anisotropic polymer material. 4,042,534, Cl. 252-511.000.

Aneta Belysning AB: *See*—
Czitrom, Georg, 4,042,290, Cl. 339-52.00R.

Angarola, Barry R., to Signode Corporation. Strap tensioner with automatic cut-off. 4,041,993, Cl. 140-123.600.

Angehrn, Jorg August, to Dresser Industries, Inc. Method and apparatus for logging earth boreholes. 4,041,780, Cl. 73-151.000.

Angel Engineering Corporation: *See*—
Hennessy, James W.; Angel, Henry R.; and Bachenheimer, Bernard O., 4,042,808, Cl. 235-92.0PC.

Angel, Henry R.: *See*—
Hennessy, James W.; Angel, Henry R.; and Bachenheimer, Bernard O., 4,042,808, Cl. 235-92.0PC.

Anselrode, Lodewijk, to Stork Brabant B.V. Method for manufacturing a metalized screen gauze. 4,042,466, Cl. 204-11.000.

Anthes, Clifford Charles: *See*—
Jones, Richard Calvin; and Anthes, Clifford Charles, 4,042,225, Cl. 266-75.000.

Antonini, Piero: *See*—
White, Richard J.; Lancini, Giancarlo; and Antonini, Piero, 4,042,683, Cl. 424-117.000.

Apollo Chemical Corporation: *See*—
Bennett, Robert P.; O'Connor, Matthew J.; Kober, Alfred E.; and Kukin, Ira, 4,042,348, Cl. 55-5.000.

Appleman, William S., to Richmond Manufacturing Company, The. Portable earth boring machine. 4,042,043, Cl. 173-152.000.

Aquashade, Inc.: *See*—
Wilson, Charles G., 4,042,367, Cl. 71-66.000.

Arakaki, Tom S. Automobile bumper and door lifting and positioning assembly. 4,042,208, Cl. 254-8.00B.

Araki, Yoshikazu, to Hitachi, Ltd. Low power dissipation combined enhancement depletion switching driver circuit. 4,042,839, Cl. 307-270.000.

Area Lighting Research, Inc.: *See*—
Duve, George, 4,042,853, Cl. 315-155.000.

Argiriardi, Andrew A., to Epic Chemical Inc. Additive for quaternary amine bactericides and algicides, compositions containing same and method of manufacture. 4,042,368, Cl. 71-67.000.

Arhippainen, Bengt; and Gullichsen, Johan, to A. Ahlstrom Osakeyhtio. Process for washing cellulose pulp from alkali digestion wherein acid is added to the washing solution. 4,042,452, Cl. 162-60.000.

Arild, Tor; and Ames, Russell R., to Accusort Corporation. Feed wheel for a sorting apparatus. 4,042,114, Cl. 209-111.70R.

Armour and Company: *See*—
Smithers, James P., 4,041,676, Cl. 53-123.000.

Armstrong Cork Company: *See*—
Buenzli, Charles W., Jr., 4,042,855, Cl. 315-219.000.

Arneklev, Duane R.; and Baker, Don R., to Stauffer Chemical Company. Sulfide herbicide antidote compositions and method of use. 4,042,371, Cl. 71-88.000.

Arpino, Ronald G. Instrument for tuning musical instruments. 4,041,831, Cl. 84-454.000.

Arsac, Aime Joseph; and Frank, Pierre, to Produits Chimiques Ugine Kuhlmann. Liquid disazo dyestuffs derived from diphenylsulphide. 4,042,579, Cl. 260-178.000.

Arthur D. Little, Inc.: *See*—
Allan, Donald S.; and Schiff, Daniel, 4,041,771, Cl. 73-40.50R.

Arvidsson, Jens Arne Krister. Garbage container carrier. 4,042,138, Cl. 214-314.000.

Asahara, Yoshiyuki; and Izumitani, Tetsuro, to Hoya Glass Works, Ltd. Non-crystalline substance having an optical memory effect. 4,042,526, Cl. 252-300.000.

Asahi Fiber Glass Company Limited: *See*—
Ishiwata, Shosuke; and Ozaki, Kaoru, 4,042,667, Cl. 423-240.000.

Asahi Glass Company Ltd.: *See*—
Nomaki, Koji; and Saoyama, Yoshihito, 4,042,725, Cl. 427-57.000.

Asahi Kasei Kogyo Kabushiki Kaisha: *See*—
Tsushima, Sakae; Misumi, Teruyuki; and Murakoshi, Masahiko, 4,042,496, Cl. 210-23.00R.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Haraguchi, Keisuke, 4,042,942, Cl. 354-171.000.

Asai, Susumu: *See*—
Shinozaki, Takashi; and Asai, Susumu, 4,041,798, Cl. 74-512.000.

Asai, Takeji; and Yamazumi, Kaishu, to Kabushiki Kaisha Fujikoshi. Process for hardening iron-containing surfaces with organic solvent and ammonia. 4,042,428, Cl. 148-16.500.

Asakawa, Yoshio, to Sumitomo Metal Mining Company Limited. Apparatus for recovering minerals, in particular manganese nodules, from the bottom of the water. 4,042,279, Cl. 299-8.000.

Asami, Hazime: *See*—
Saitoh, Osamu; Imaki, Masakatu; and Asami, Hazime, 4,042,332, Cl. 23-232.00R.

Asano, Kiro; Tamura, Humio; Saito, Tsuyoshi; and Kawai, Yoshio, to Kureha Kagaku Kogyo Kabushiki Kaisha. Process for the conversion of pitch into crystalloidal pitch. 4,042,486, Cl. 208-44.000.

Asberg, Per Anders: *See*—
Falkinger, Willard; and Asberg, Per Anders, 4,042,125, Cl. 214-6.0BA.

Asberg, Sture L., to SKF Industries, Inc. Method for forming bearing unit. 4,042,422, Cl. 148-12.00R.

ASEA Aktiebolag: *See*—
Larsson, Hans Gunnar, 4,041,743, Cl. 72-60.000.
Larsson, Hans Gunnar, 4,041,744, Cl. 72-60.000.

Ashbrook, Walter L., to Champion International Corporation. Guard for slitting wheel. 4,041,823, Cl. 83-478.000.

Aspro, Inc.: *See*—
Kraft, Derald H., 4,041,746, Cl. 72-83.000.

Associated Portland Cement Manufacturers Limited, The: *See*—
Murray, Ransom James; and Brown, Arthur William, 4,042,408, Cl. 106-100.000.

Atkins, Carl E., to Wagner Electric Corporation. Dual frequency narrow-band frequency modulated keyable control circuit and keying circuit therefor. 4,042,970, Cl. 361-172.000.

Atkinson, E. Ronald, to United States of America, Navy. Frequency domain discrimination and counting technique. 4,042,829, Cl. 250-550.000.

Atkinson, Paul Ray. Pocketed garment. 4,041,549, Cl. 2-94.000.

Atlantic Pipe Corporation: *See*—
Ottmann, Norman; and Strever, Walter, 4,042,315, Cl. 425-392.000.

Attridge, Russell G., Jr.: *See*—
Demaray, Merlin E.; and Attridge, Russell G., Jr., 4,042,013, Cl. 165-2.000.

Auel, Theodor; Ulrich, Hannsjorg; Wasel-Nielen, Horst-Dieter; and Heymer, Gero, to Hoechst Aktiengesellschaft. Process for inhibiting the corrosions and deposition of boiler scale in water-conveying systems. 4,042,324, Cl. 21-2.70A.

Augier-Gibory, Solange: *See*—
Augier, Jacques; and Augier-Gibory, Solange, 4,042,574, Cl. 260-112.00R.

Augier, Jacques; and Augier-Gibory, Solange, to Institut Pasteur. Purification of tuberculoproteins. 4,042,574, Cl. 260-112.00R.

Aurora Equipment Company: *See*—
Mittag, Douglas C., 4,041,646, Cl. 49-385.000.

Ausatuft S.p.A.: *See*—
Frigo, Vito, 4,042,120, Cl. 214-1.0BB.

Automated Packaging Systems, Inc.: *See*—
Lerner, Bernard, 4,041,846, Cl. 93-35.0PC.

Automobile Corporation of America: *See*—
Horwinski, Elwood R., 4,042,056, Cl. 180-65.00A.

Automobiles Peugeot: *See*—
Rivere, Jean-Pierre, 4,041,918, Cl. 123-139.0AW.

Auvil, Clifford J.: *See*—
Palmer, Thomas Y.; and Auvil, Clifford J., 4,041,759, Cl. 73-231.00R.

Avaro, Michel; and Mangin, Pierre, to Naphtachimie. Polymerization of olefins with pre-activated catalysts. 4,042,771, Cl. 526-124.000.

Avco Corporation: *See*—
Ivanko, Theodore, 4,042,434, Cl. 156-91.000.

Avenska Utvecklingsaktiebolaget (SU): *See*—
Lundin, Sven Vilhelm Emanuel, 4,041,608, Cl. 32-22.000.

B. E. Wallace Products Corporation: *See*—
Wallace, Bernard E., 4,041,875, Cl. 104-126.000.

B & G Hydraulics Limited: *See*—
Hamblett, Victor Hugh, 4,041,616, Cl. 35-19.00R.

B. V. Beverolfabrieken: *See*—
van Zalm, Fredericus Bastiaan, 4,042,515, Cl. 252-56.00R.

B.Y. (Simulated Furs) Limited: *See*—
York, Herbert, 4,041,731, Cl. 66-50.00B.

Baader, Edward J.: *See*—
Baader, Joseph E.; and Baader, Edward J., 4,042,820, Cl. 240-52.00R.

Baader, Joseph E.; and Baader, Edward J. Molded lamp housing. 4,042,820, Cl. 240-52.00R.

Baba, Shigeji; Okubo, Bunji; and Sakamoto, Eiichi, to Konishiroku Photo Industry Co., Ltd. Light-sensitive silver halide photographic material. 4,042,400, Cl. 96-124.000.

Baba, Takashi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Piston-cylinder unit for use in a disc brake assembly. 4,042,072, Cl. 188-71.800.

Babbitt, John H., Jr., to Caterpillar Tractor Co. Mounting for securing tools to vehicles. 4,042,261, Cl. 280-762.000.

Babunovic, Momir, to Barry-Wehmiller Company. Container washer apparatus. 4,041,963, Cl. 134-104.000.

Bach, Lloyd G.: *See*—
Tang, Louis S.; Runkle, Dean E.; and Bach, Lloyd G., 4,041,990, Cl. 138-31.000.

Bachenheimer, Bernard O.: *See*—
Hennessy, James W.; Angel, Henry R.; and Bachenheimer, Bernard O., 4,042,808, Cl. 235-92.0PC.

Bachl, Robert; Frielingsdorf, Hans; Gruber, Wolfgang; Mueller-Tamm, Heinz; and Gonsior, Leonhard, to BASF Aktiengesellschaft. Manufacture of olefin polymers. 4,042,770, Cl. 526-106.000.

Bachman, Charles W.; and Franklin, Benjamin S., to Honeywell Information Systems Inc. Database set condition test instruction. 4,042,912, Cl. 364-200.000.

Backer, Klaus; Heinze, Helga; Luck, Wolfhard; and Spahrkas, Heinrich, to Bayer Aktiengesellschaft. Tanning of hides. 4,042,321, Cl. 8-94.260.

Bacon, Duane E.; Gattermeir, J. David; Hecox, Spencer S.; and Robb, John J., to Western Electric Company, Inc. Electrolytically treating a selected cylindrical surface of an article. 4,042,467, Cl. 204-15.000.

Bacskai, Robert, to Chevron Research Company. Sulfonic acid derivatives as promoters for the polymerization of 2-pyrrolidone. 4,042,573, Cl. 260-78.00P.

Badische Anilin- & Soda-Fabrik Aktiengesellschaft: *See*—
Dehnert, Johannes; and Lamm, Gunther, 4,042,578, Cl. 260-156.000.
Kiehs, Karl; Koenig, Karl-Heinz; and Fischer, Adolf, 4,042,628, Cl. 260-577.000.

Baier, Kurt: *See*—
Razim, Claus; Lovasz, Csaba; and Baier, Kurt, 4,042,427, Cl. 148-15.500.

Bailey, Berton K.: *See*—
Underhill, Edward W.; Chisholm, Melvin D.; Steck, Warren F.; Bailey, Berton K.; Lamb, Peter M.; Struble, Dean L.; and Swailes, G. Edward, 4,042,681, Cl. 424-84.000.

Baker, Don R.: *See*—
Arneklev, Duane R.; and Baker, Don R., 4,042,371, Cl. 71-88.000.

Baker Oil Tools, Inc.: *See*—
Shurtleff, George S., 4,041,762, Cl. 73-422.00R.

Baker, Roxton Elliott, to Combustion Engineering, Inc. Overvoltage protection circuit for general purpose amplifier. 4,042,889, Cl. 330-207.00P.

Baker, William C.; and Chapman, John J., to Teledyne, Inc. Fluid flowmeter. 4,041,757, Cl. 73-202.000.

Balfanz, Glenn F., Jr.: *See*—
Jahn, Martin D.; and Balfanz, Glenn F., Jr., 4,041,668, Cl. 52-489.000.

Balfour, Adrian E.: *See*—
Hardy, Henry; and Balfour, Adrian E., 4,042,433, Cl. 156-87.000.

Balke-Durr AG: *See*—
Fickelscher, Kurt Gerhard, 4,041,808, Cl. 74-800.000.

Ballendux, Gerardus M.: *See*—
Hoepfl, Joseph R.; and Ballendux, Gerardus M., 4,041,972, Cl. 137-269.000.

Ballweber, Edward G.; and Hunter, Wood E., to Nalco Chemical Company. Urea as an additive to improve the viscosity and activity of acrylamide-acrylamide acrylic acid polymers prepared from poor quality acrylamide. 4,042,772, Cl. 526-220.000.

Balmat, Jean Louis, to Du Pont de Nemours, E. I., and Company. SO_2 removal process. 4,042,668, Cl. 423-243.000.

Bamberg, Wolfgang: *See*—
Schmidt, Joachim; Bamberg, Wolfgang; Grunert, Hartmut; Schorm, Erhard; and Weigelt, Christian, 4,042,502, Cl. 210-59.000.

Banholzer, Rolf; Bauer, Rudolf; Heusner, Alex; and Schulz, Werner, to Boehringer Ingelheim GmbH. Quaternary N-β-substituted N-alkylnortropine benzilates. 4,042,700, Cl. 424-265.000.

Bantick, John Raymond: *See*—
Lee, Thomas Brian; Hardern, David Norman; and Bantick, John Raymond, 4,042,708, Cl. 424-283.000.

Barber-Colman Company: *See*—
Boyer, George C.; and Fermanich, Raymond J., 4,042,173, Cl. 236-49.000.

Barcan, Donald S., to C. R. Bard, Inc. Medical procedure package. 4,042,109, Cl. 206-440.000.

Barker, Michael D.; Isaac, Eirlys R.; Kirby, Peter; and Smith, Graham C., to Shell Oil Company. Compositions and methods of combatting weeds in crops with 2,6-dihalobenzyl ether. 4,042,369, Cl. 71-88.000.

Barlow, George J.: *See*—
Cassarino, Frank V., Jr.; and Barlow, George J., 4,042,832, Cl. 307-149.000.

Barone, Salvatore: *See*—
Lloyd, William A.; Barone, Salvatore; Hooper, Gerald E.; and McFarland, Keith E., 4,042,939, Cl. 346-153.000.

Barrick, Robert R., to Cowen, John F. Bowstring release device. 4,041,925, Cl. 124-35.00A.

Barry-Wehmiller Company: *See*—
Babunovic, Momir, 4,041,963, Cl. 134-104.000.

Bartell, Maurice James. Device for moving a rock at the entrance of a rock crusher. 4,042,121, Cl. 214-1.00R.

Barthold, Fred O. Power transistor switch. 4,042,844, Cl. 307-314.000.

Barton, William R. Medicated member for pierced ears. 4,041,946, Cl. 128-260.000.

BASF Aktiengesellschaft: *See*—
Bachl, Robert; Frielingsdorf, Hans; Gruber, Wolfgang; Mueller-Tamm, Heinz; and Gonsior, Leonhard, 4,042,770, Cl. 526-106.000.
Eilingsfeld, Heinz; and Lach, Dietrich, 4,042,604, Cl. 260-369.000.
Hartwig, Ernst, 4,042,605, Cl. 260-378.000.
Kiehs, Karl; Adolphi, Heinrich; and Huber, Rolf, 4,042,691, Cl. 424-200.000.
Pommer, Ernst-Heinrich; Polster, Rudolf; and Loecher, Friedrich, 4,042,686, Cl. 424-164.000.
Weitz, Hans-Martin; Fischer, Rolf; and Lenke, Dieter, 4,042,587, Cl. 544-183.000.
Weitz, Hans-Martin; Fischer, Rolf; and Lenke, Dieter, 4,042,588, Cl. 544-183.000.

Bass, Edward W.: *See*—
Bresnahan, Robert A.; Bass, Edward W.; and Mader, William G., 4,041,609, Cl. 32-22.000.

Battelle Memorial Institute: *See*—
Bienvenu, Gerard; and Gentaz, Claude, 4,042,377, Cl. 75-53.000.

Baudouin, Yvonne; Simonet, Guy; Eluard, Robert; and Pivard, Claude, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Method of fractionation of a gaseous mixture by adsorption. 4,042,349, Cl. 55-25.000.

Bauer Bros. Co., The: *See*—
Ginaven, Marvin E., 4,042,511, Cl. 210-386.000.

Bauer, Rudolf: *See*—
Banholzer, Rolf; Bauer, Rudolf; Heusner, Alex; and Schulz, Werner, 4,042,700, Cl. 424-265.000.

Baugh, Benton F., to Vetco Offshore Industries, Inc. Method and apparatus for connecting submarine pipelines. 4,041,719, Cl. 61-110.000.

Baum, Elliot H.; and Ferrante, Gerald R., to Kewanee Industries. Dye-bath oxidants. 4,042,319, Cl. 8-35.000.

Baxter, Charles A. R.: *See*—
Acheson, Richard M.; Stubbs, John K.; Baxter, Charles A. R.; and Kuhla, Donald E., 4,042,583, Cl. 542-458.000.

Bayer Aktiengesellschaft: *See*—
Backer, Klaus; Heinze, Helga; Luck, Wolfhard; and Spahrkas, Heinrich, 4,042,321, Cl. 8-94.260.
Bernert, Claus-Rudiger; Radlmann, Eduard; and Nischk, Gunther, 4,042,570, Cl. 260-75.00M.
Dahm, Manfred; and Gonzalez-Dorner, Alberto Carlos, 4,042,537, Cl. 260-2.5AP.
Dieterich, Dieter; Markusch, Peter; and Reiff, Helmut, 4,042,536, Cl. 260-2.5AK.
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; and Stendel, Wilhelm, 4,042,690, Cl. 424-200.000.
Kaiser, Bernd-Ulrich; Dhein, Rolf; Rudolph, Hans; and Kuchenmeister, Rolf, 4,042,547, Cl. 260-22.00R.
Kuhlthau, Hans-Peter, 4,042,322, Cl. 8-168.00R.
Muller, Ernst-Willi; and Wicke, Manfred, 4,042,768, Cl. 526-65.000.
Sundermann, Rudolf, 4,042,567, Cl. 260-49.000.
von Bonin, Wulf; Preis, Lothar; von Gizycki, Ulrich; and Dahm, Manfred, 4,042,558, Cl. 260-37.00N.

Bayly, Peter Kingsley, to Wiltshire Cutlery Company Proprietary Ltd. Knife sharpener. 4,041,651, Cl. 51-214.000.

BBC Brown, Boveri & Company, Limited: *See*—
Akyuerek, Altan; and Meyer, Eckhard, 4,041,602, Cl. 29-588.000.

BDH, Inc.(Entire): *See*—
Bowen, James H., 4,042,509, Cl. 210-192.000.

Beatrice Foods Co.: *See*—
Ziccarelli, Salvatore F., 4,042,721, Cl. 426-613.000.

Bechtel, Jon H., to Robertshaw Controls Company. Temperature sensing resistance probe and method of making a resistance element therefor. 4,042,901, Cl. 338-28.000.

Beck, Nicholas Robert; Leonard, Gordon C.; and Prince, Jack A., to Meat Separator Corporation. Deboning apparatus and method. 4,042,176, Cl. 241-24.000.

Becker, Carl; Wegmann, Jacques; and Schaub, Andres, to Ciba-Geigy AG. Anionic and nonionic emulsified dye suspension with formalin, hydrotropic agent. 4,042,320, Cl. 8-39.00C.

Becker, Carl: *See*—
Defago, Raymond; Lapple, Arnulf Ruediger; and Becker, Carl, 4,042,545, Cl. 260-13.000.

Beckley, Addison S. Motor vehicle injury and damage prevention system. 4,042,057, Cl. 180-90.000.

Becton, Dickinson and Company: *See*—
Ehrlich, Stephen Jeffrey, 4,042,145, Cl. 221-94.000.
Hochstrasser, Harry T., 4,042,329, Cl. 23-230.00B.
Kopacz, Bernard F., 4,042,805, Cl. 219-492.000.

Beduhn, Daniel E.; Morrow, James G., Sr.; and Pech, David J., to Manitowoc Company, Inc., The. Rotary counterweight crane with a removal track section. 4,042,115, Cl. 212-48.000.

Beggs, Donald, to Midrex Corporation. Method and apparatus for producing metallic iron pellets. 4,042,226, Cl. 266-88.000.

Beiser, Carl Adolph, to National Steel Corporation. Chromized steel substrate. 4,042,426, Cl. 428-667.000.

Bell & Howell Company: *See*—
Gawin, Adolph J.; and Porazinski, Robert F., 4,042,299, Cl. 355-40.000.
Wells, Thomas R.; and Jacobs, Donald R., 4,042,296, Cl. 352-78.00R.

Bell, Robert Glenn; Gillyns, Emile; and McDaniel, Olin Kilpatrick, Jr., to Du Pont de Nemours, E. I., and Company. Heat-setting process for polyester film. 4,042,569, Cl. 260-75.00T.

Bell Telephone Laboratories, Incorporated: *See*—
Cohen, Richard Lewis; and Meek, Ronald Lee, 4,042,730, Cl. 427-305.000.
Freimanis, Laimons, 4,042,786, Cl. 179-84.00R.
Presby, Herman Melvin, 4,042,723, Cl. 427-8.000.

Bellenger, Donald M., to Telephone Electronics Corporation. Telephone mouthpiece keyboard. 4,042,793, Cl. 179-90.00K.

Beloit Corporation: *See*—
Justus, Edgar J., 4,042,503, Cl. 210-65.000.

Belot, Michel; and Perucchi, Norberto, to Ebauches S.A. Mechanism of transmission. 4,041,794, Cl. 74-460.000.

Belyashina, Lidia Ivanovna: *See*—
Kazakova, Ljudmila Petrovna; Gundyrev, Alexei Alexandrovich; Rudakova, Nina Yakovlevna; Sharf, Fridrikh-Leopold Khaskelevich; Garun, Yaroslav Evstavievich; Belyashina, Lidia Ivanovna; and Kocheva, Zoya Vasilievna, 4,042,411, Cl. 106-270.000.

Bendix Corporation, The: *See*—
Espy, Donald M.; and Henry, James L., 4,042,122, Cl. 214-1.0CM.
Natter, Eckard F.; Weant, George E.; and Lobsinger, James R., 4,042,922, Cl. 343-5.00W.
Tang, Louis S.; Runkle, Dean E.; and Bach, Lloyd G., 4,041,990, Cl. 138-31.000.

Bennett, James Gordy, Jr.; and Cooper, Glenn Dale, to General Electric Company. Method for preparing polyphenylene ethers. 4,042,564, Cl. 260-47.0ET.

Bennett, Robert P.; O'Connor, Matthew J.; Kober, Alfred E.; and Kukin, Ira, to Apollo Chemical Corporation. Method of conditioning flue gas to electrostatic precipitator. 4,042,348, Cl. 55-5.000.

Benzakein, Morris. Method and apparatus for weaving an elongated fabric. 4,041,988, Cl. 139-116.000.

Beppu, Norio: *See*—
Matsuda, Motonobu; and Beppu, Norio, 4,042,940, Cl. 354-39.000.

Bequaert, Frank Charles; and Rochester, Nathaniel, to International Business Machines Corporation. One-handed keyboard and its control means. 4,042,777, Cl. 179-79.000.

Beregi, Laszlo; Hugon, Pierre; Pascaud, Xavier; and Poignant, Jean-Claude, to Science Union et Cie, Societe Francaise de Recherche Medicale. Disubstituted azabicycloalkanes. 4,042,598, Cl. 260-326.100.

Berger, Joan P.: *See*—
Berger, Phill R.; Berger, Joan P.; and Magnani, Margery L., 4,041,585, Cl. 28-149.000.

Berger, Phill R.; Berger, Joan P.; and Magnani, Margery L. Hand loom construction. 4,041,585, Cl. 28-149.000.

Bergomi, Luciano, to Industrie Pirelli S.p.A. Reinforcing element for flexible structures, in particular pneumatic tires. 4,042,742, Cl. 428-295.000.

Bernard, Brian C., to Clorox Company, The. Fire log process and apparatus. 4,042,343, Cl. 44-10.00B.

Bernert, Claus-Rudiger; Radlmann, Eduard; and Nischk, Gunther, to Bayer Aktiengesellschaft. Terephthalic acid copolyesters which can be dyed in the absence of carriers. 4,042,570, Cl. 260-75.00M.

Berry, Thomas: *See*—
Foster, Peter William; Ferrier, Duncan Cameron; Berry, Thomas; and Murenbeeld, Karel, 4,041,586, Cl. 28-254.000.

Bertin & Cie: *See*—
Bertin, Jean Henri; Guienne, Paul; and Lafont, Andre, 4,042,060, Cl. 180-127.000.

Bertin, Jean Henri; Guienne, Paul; and Lafont, Andre, to Bertin & Cie; and Societe d'Etudes et de Developpement des Aeroglisseurs Marins, Terrestrea et Amphibies S.E.D.A.M. Air-lift vehicles. 4,042,060, Cl. 180-127.000.

Bertolasi, Robert B., to Kelsey-Hayes Company. Anti-spin control system. 4,042,059, Cl. 180-103.00R.

Bertolino, Giorgio M., to Fiat-Allis Construction Machinery, Inc. Track laying tractor with movable boom which can be tilted laterally. 4,042,116, Cl. 212-140.000.

Bertram, Heidrun; Fahnenstich, Rudolf; Junkermann, Helmut; Pohl, Gerhard; and Tanner, Herbert, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Preservative for fodder, mixed fodder and silage. 4,042,716, Cl. 426-335.000.

Betts, Edmund Douglas, to Outboard Marine Corporation. Apex seal assembly. 4,042,312, Cl. 418-121.000.

Beyn, Edgar Joachim, to SCM Corporation. Process for spray forming of discrete particles. 4,042,653, Cl. 264-7.000.

Bianchetta, Donald L., to Caterpillar Tractor Co. Pressure controlled swing valve with safety feature. 4,041,983, Cl. 137-625.630.

Bickford, Edgar P., to Raymond Lee Organization, Inc., The, a part interest. Body heating and stretch support device. 4,042,803, Cl. 219-211.000.

Bienvenu, Gerard; and Gentaz, Claude, to Battelle Memorial Institute. Method of and composition for the desulfurization of steel. 4,042,377, Cl. 75-53.000.

Biere, Helmut: *See*—
Ahrens, Hanns; Koch, Henning; Schroder, Eberhard; Biere, Helmut; and Kapp, Joachim-Friedrich, 4,042,706, Cl. 424-273.00P.

Biggins, Robert B. Double seal container. 4,042,143, Cl. 220-256.000.

Bigler, Allan Johan: *See*—
Buus, Jorn Lasse Martin; Lassen, Niels; and Bigler, Allan Johan, 4,042,695, Cl. 424-250.000.

Bihuniak, Peter P.; Brandes, Lewis H.; and Guile, Donald L., to Corning Glass Works. Method of densifying metal oxides. 4,042,361, Cl. 65-18.000.

Bijlmer, Paul Frederik A., to Fokker-VFW B.V. Pickling of aluminum. 4,042,475, Cl. 204-141.500.

Bildl, Erich: *See*—
Schmidt, Dietrich; Hofer, Johann; Lang, Winfried; and Bildl, Erich, 4,042,331, Cl. 23-230.0PC.

Billings, Lawrence A. Jr.; Evanicky, Daniel E.; Hull, V. Joseph; and Ristagno, Charles V., to Micro-Display Systems, Inc. Illuminated electro-optical display apparatus. 4,042,294, Cl. 350-60LC.

Bilz, Reiner, to Otto Bilz Werkzeugfabrik. Overland coupling device. 4,041,729, Cl. 64-29.000.

Binaghi, Marco: *See*—
Gratani, Francesco; and Binaghi, Marco, 4,042,764, Cl. 526-4.000.

Bio-Medical Sciences Inc.: *See*—
Larsson, Raymond P., 4,042,336, Cl. 23-253.0TP.

Birney, Richard Eugene; Davis, Michael Ian; Graybiel, Lynn Allan; Hood, Robert Allen; Kahn, Samuel; and Osborne, William Steese, to International Business Machines Corporation. Address key register load/store instruction system. 4,042,913, Cl. 364-200.000.

Bishop, Dale F. Hydrostatic level instrument. 4,041,613, Cl. 33-367.000.

Bishop, Thomas G., to HPM Corporation. Mottled appearance injection molding methods. 4,042,660, Cl. 264-77.000.

Biter, William J., to Westinghouse Electric Corporation. Photovoltaic device and method of making same. 4,042,418, Cl. 136-89.00P.

BJ-Hughes Inc.: *See*—
Scott, Lyle Burnell, 4,042,014, Cl. 166-.500.

Bjerk, Roger O.; Brandon, William D.; Engleking, Frederick S.; and Jero, John P., to Caterpillar Tractor Co. Friction coupling. 4,042,085, Cl. 192-57.000.

Black, Richard William, to Du Pont de Nemours, E. I., and Company. Bobbin lugger. 4,041,589, Cl. 29-33.00M.

Blanchard, Clarence E., to Outboard Marine Corporation. Marine propulsion device steering assembly. 4,041,889, Cl. 115-18.00R.

Blauvelt, Lon; Dickson, J. Douglas; and Russell, Robert C., to Simplicity Pattern Co. Inc. Methods and apparatus for retrieval of stored articles from a stack. 4,042,126, Cl. 214-8.50A.

Blevins, Theodore J., to General Electric Company. Fastening device and method for hingedly assembling members. 4,041,571, Cl. 16-128.00R.

Blomberg, Bengt Ture Hubertus: *See*—
Johansson, Erik Gunnar; Blomberg, Bengt Ture Hubertus; and Elmquist, Bernt Holger, 4,041,962, Cl. 132-91.000.

Blunier, Dennis L.: *See*—
Haslett, Glenn M.; and Blunier, Dennis L., 4,042,282, Cl. 305-11.000.
Blurton, Keith F.; and Sedlak, John M., to Energetics Science, Inc. Method for the detection and measurement of noxious gases. 4,042,464, Cl. 204-1.00T.
Bodenseewerk Perkin-Elmer & Co. GmbH: *See*—
Huber, Bernhard Werner, 4,042,303, Cl. 356-85.000.
Huber, Bernhard Werner, 4,042,338, Cl. 23-259.000.
Boehringer Ingelheim GmbH: *See*—
Banholzer, Rolf; Bauer, Rudolf; Heusner, Alex; and Schulz, Werner, 4,042,700, Cl. 424-265.000.
Buchta, Karl; Abdou, Mohamed; and Woltersdorf, Harald, 4,042,733, Cl. 427-391.000.
Griss, Gerhart; Grell, Wolfgang; Hurnaus, Rudolf; Sauter, Robert; Eisele, Bernhard; Kaubisch, Nikolaus; and Leitold, Matyas, 4,042,711, Cl. 424-319.000.
Mentrup, Anton; Schromm, Kurt; Thoma, Otto; and Zeile, Karl, 4,042,713, Cl. 424-330.000.
Boeing Company, The: *See*—
Boyle, James Alfred; Galins, Peteris Adams; Gregoire, Mark Charles; and O'Toole, Peter L. M., 4,042,197, Cl. 244-183.000.
Johnson, Kirby William, 4,042,191, Cl. 244-214.000.
Bohman, Carl E.; Durling, Hubert R., Jr.; Susman, Leon; and Rolfe, Norman F., to Sperry Rand Corporation. Spout control apparatus for agricultural machines. 4,042,132, Cl. 214-42.00A.
Boileau, Jacques: *See*—
Thevenin, Michel J.; Brun, Michel; Boileau, Jacques; and Pegoud, Joseph, 4,041,866, Cl. 102-24.0HC.
Bomar, Scott Lewis: *See*—
Troncoso, Fernando, Jr.; and Bomar, Scott Lewis, 4,041,926, Cl. 124-35.00A.
Bona, Constantin: *See*—
Ciorbaru, Rita, born Sfartz; Adam, Arlette, born Chosson; Petit, Jean-Francois; Lederer, Edgar; Damais, Chantal, born Rousselot; Chedid, Louis; and Bona, Constantin, 4,042,678, Cl. 424-12.000.
Bondelier, Francis C., Jr.: *See*—
King, Roger P.; Grosskopf, John W., Jr.; and Bondelier, Francis C., Jr., 4,042,364, Cl 65-168.000.
Bonin, Jean Claude, to Roto Diesel. Fuel injection pump for internal combustion engines, in particular for diesel engines. 4,041,919, Cl. 123-139.00P.
Bonsack, Francois, to Les Fabriques d'Assortiments Reunies. Escapement for a timepiece. 4,041,693, Cl. 58-116.00R.
Boochever, Evelyn; and Munk, Michael. Environmental humidification and cooling system. 4,042,016, Cl. 165-20.000.
Borden, Inc.: *See*—
Chiu, Shui Tung; and Kaneko, Tatsuhei, 4,042,728, Cl. 427-212.000.
Borel, Robert J.: *See*—
Tone, Frederick F.; and Borel, Robert J., 4,042,395, Cl. 96-76.00C.
Borello, Domenic. Battery. 4,042,754, Cl. 429-10.000.
Borg-Warner Corporation: *See*—
Coy, Merle Dalton, 4,041,791, Cl. 74-325.000.
Maudlin, Eugene Wendell, 4,041,727, Cl. 62-290.000.
Schulz, Willis Lorenz, 4,042,083, Cl. 192-3.310.
Bose Corporation: *See*—
Jarvis, Arthur B., 4,042,307, Cl. 403-290.000.
Bose, Edward B.: *See*—
Graven, Andrew A.; Ronyak, David M.; and Bose, Edward B., 4,041,652, Cl. 51-241.00R.
Botting, Alden Joseph; Mulcahy, John Michael; and Hannah, William James. Method of molding modular buildings. 4,042,659, Cl. 264-71.000.
Bourke, Donall Garraid; and Puttlitz, Frederic John, to International Business Machines Corporation. Outer and asynchronous storage extension system. 4,042,911, Cl. 364-900.000.
Bouy, Pierre; and Cheradame, Guy, to Rhone-Progil. Electrolysis cell electrode and method of preparation. 4,042,483, Cl. 204-290.00F.
Bowdish, Frank W. Process for leaching sand or other particulate material. 4,042,671, Cl. 423-340.000.
Bowdry, William Perrin, III; and Wickam, Irwin Edward, to Stewart Engineering & Equipment Co. Pan unstacking and stacking system. 4,042,124, Cl. 214-6.0DS.
Bowen, James H., to BDH, Inc.(Entire). Water treatment system. 4,042,509, Cl. 210-192.000.
Bowles, Bobby K.: *See*—
Anderson, Buddy W.; Bowles, Bobby K.; Murphey, Joseph R.; Totty, Kenneth D.; and Young, Bill M., 4,042,032, Cl. 166-276.000.
Bowman, Robert Mathews, to Ciba-Geigy Corporation. 7,7-Diphenyl-1,4-oxazepinoalkyl-dicarboximides. 4,042,701, Cl. 424-267.000.
Boyer, Alvin Clifford, to Shell Oil Company. Insecticidal sulfonium salts. 4,042,696, Cl. 424-251.000.
Boyer, George C.; and Fermanich, Raymond J., to Barber-Colman Company. Method and apparatus for controlling volume air flow. 4,042,173, Cl. 236-49.000.
Boyer, Jean Jacques, to Societe Anonyme Secmafer. Apparatus for removing, cleaning and replacing railroad ballast. 4,042,035, Cl. 171-16.000.
Boyle, James Alfred; Galins, Peteris Adams; Gregoire, Mark Charles; and O'Toole, Peter L. M., to Boeing Company, The. Automatic controls for airplane take-off and landing modes. 4,042,197, Cl. 244-183.000.
Brada, Pavel; Kucera, Jaromir; Chladek, Otokar; Voda, Gustav; Novacek, Jindrich; and Kollmann, Jan, to Elitex. Yarn guide control. 4,041,733, Cl. 66-138.000.
Braden, Ray S.: *See*—
Ury, Michael Gerson; Eastlund, Bernard John; Braden, Ray S.; and Wood, Charles H., 4,042,850, Cl. 315-39.000.
Brandenstein, Manfred: *See*—
Ernst, Horst M.; Brandenstein, Manfred; and Olschewski, Armin, 4,042,086, Cl. 192-98.000.
Brandes, Lewis H.: *See*—
Bihuniak, Peter P.; Brandes, Lewis H.; and Guile, Donald L., 4,042,361, Cl. 65-18.000.
Brandewie, Richard A.; Davis, Walter C.; and Macken, John A., to Rockwell International Corporation. Laser radar device utilizing heterodyne detection. 4,042,822, Cl. 250-216.000.
Brandon, William D.: *See*—
Bjerk, Roger O.; Brandon, William D.; Engleking, Frederick S.; and Jero, John P., 4,042,085, Cl. 192-57.000.
Branigan, John G.: *See*—
Polichette, Joseph; Leech, Edward J.; and Branigan, John G., 4,042,729, Cl. 427-304.000.
Breitschwerdt, Werner, to Daimler-Benz Aktiengesellschaft. Seat, especially co-driver seat in a motor vehicle. 4,042,276, Cl. 297-216.000.
Brener, Richard F., to Harnischfeger Corporation. Overhead crane including an improved hoist drum and redundant hoist drum support means. 4,042,214, Cl. 254-186.00R.
Brennecke, Hermann; and Liere, Horst. Electrostatic charge neutralization. 4,042,971, Cl. 361-213.000.
Breslow, B. Arthur, to United States of America, Navy. Desensitizer for n-propyl nitrate. 4,042,432, Cl. 149-89.000.
Bresnahan, Robert A.; Bass, Edward W.; and Mader, William G., to Dentsply Research & Development Corporation. Foot control for dental equipment. 4,041,609, Cl. 32-22.000.
Brethauer, Dale M., to Du Pont de Nemours, E. I., and Company. Stackable yarn support. 4,042,108, Cl. 206-392.000.
Breton, Ernest J.; Worden, Dexter; and Pugh, Melville E., Jr., to Teti, Joseph A., Jr.; and Teti, William C., part interest to each. Gasket and sealing structures of filled polytetrafluoroethylene resins. 4,042,747, Cl. 428-323.000.
Brey, Robert J.: *See*—
Rayle, Roy E.; Brey, Robert J.; and Woodruff, Wilbur John, 4,041,868, Cl. 102-43.00F.
Brian, Michael: *See*—
Gregory, Charles E.; Brian, Michael; Thomas, Jerald F.; and Cameron, James F., 4,041,554, Cl. 4-10.000.
Brice, Neil M., to Cornell Research Foundation, Inc. Method and apparatus for triggering a substantial change in earth characteristics and measuring earth changes. 4,042,196, Cl. 244-158.000.
Bright, Robert G., to Draftex Development AG. Channel-shaped flexible sealing strips. 4,042,741, Cl. 428-217.000.
Brisken, Alex F.: *See*—
Anderson, Roy E.; Brisken, Alex F.; and Lewis, James R., 4,042,926, Cl. 343-17.700.
British Aircraft Corporation Limited: *See*—
Gay, Cecil Arthur Joseph; and Rockey, Leslie George Henry, 4,042,801, Cl. 219-121.0EB.
British Cellophane Limited: *See*—
Ferrar, Andrew Nicholas, 4,042,732, Cl. 427-385.00R.
British Steel Corporation: *See*—
Jackson, George; and Fieldsend, Terence, 4,042,384, Cl. 75-214.000.
Broadwin, Alan: *See*—
Weiss, Steven N.; and Broadwin, Alan, 4,041,947, Cl. 128-276.000.
Brody, Thomas P.: *See*—
Luo, Fang-Chen; and Brody, Thomas P., 4,042,854, Cl. 315-169.0TV.
Brois, Stanley J., to Exxon Research and Engineering Co. Olefin-thionophosphine sulfide reaction products, their derivatives and use thereof as oil and fuel additives. 4,042,523, Cl. 252-32.7HC.
Broken Hill Associated Smelters Proprietary Limited, The: *See*—
Ward, Denby Harcourt; and Iley, James Dixon, 4,042,228, Cl. 266-215.000.
Broken Hill proprietary Company Limited, The: *See*—
Callcott, Thomas George; and Deague, Terrence Kevin, 4,042,344, Cl. 48-197.00R.
Brooke, Arthur Alan; and Loben, Rudy, to Delamere & Williams Company Limited. Method and apparatus for flattening and sealing pouch tops. 4,041,673, Cl. 53-39.000.
Brossia, Charles Edward, to Adolph Coors Company. Slip pallet and divider sheet. 4,042,127, Cl. 214-10.50R.
Brotman, Morley: *See*—
High, Cliff, 4,041,814, Cl. 83-18.000.
Brown, Arthur William: *See*—
Murray, Ransom James; and Brown, Arthur William, 4,042,408, Cl. 106-100.000.
Brown, Haskell R., Jr.: *See*—
Hammond, John M.; and Brown, Haskell R., Jr., 4,042,211, Cl. 254-57.000.
Brown, Kenneth Robson; and Sharp, Colin Keith, to Ferranti Limited. Electronic multipliers. 4,042,815, Cl. 235-194.000.
Brown, Paul C.: *See*—
Kasel, Richard G.; and Brown, Paul C., 4,042,168, Cl. 229-40.000.
Brown, William W., to Westinghouse Electric Corporation. Process for dissolving radioactive corrosion products from internal surfaces of a nuclear reactor. 4,042,455, Cl. 176-37.000.

Brownell, Roy D., to Caterpillar Tractor Co. Single lever control arrangement for actuating multiple valves. 4,041,976, Cl. 137-351.000.

Brugger, Wilhelm; and Greinacher, Ekkehard, to Th. Goldschmidt AG. Process for preparing carbonated zirconium oxide hydrate. 4,042,672, Cl. 423-419.00R.

Brun, Michel: *See—*
Thevenin, Michel J.; Brun, Michel; Boileau, Jacques; and Pegoud, Joseph, 4,041,866, Cl. 102-24.0HC.

Brundler, Hans Josef. Gear unit for the transformation of a uniform rotary movement to a step or stroke movement. 4,041,787, Cl. 74-117.000.

Bruning, Klaus; Junger, Hans; Pungs, Wolfgang; Rheinfeld, Peter; Weissenfels, Franz; and Wienand, Michael, to Dynamit Nobel Aktiengesellschaft. Apparatus for the continuous manufacture of phenolic resin foam in endless sheets. 4,042,314, Cl. 425-89.000.

Brunnett, Carl J.; and Gerth, Vernon W., Jr., to Picker Corporation. Tomography system having an ultrahigh-speed processing unit. 4,042,811, Cl. 235-151.300.

Bucher, Robert, to Sulzer Brothers Limited. Jacquard machine equipped with lifting wires and stationary arresting blades. 4,041,987, Cl. 139-59.000.

Buchta, Karl; Abdou, Mohamed; and Woltersdorf, Harald, to Boehringer Ingelheim GmbH. Forming solid, adhesive-free composite of membrane filters and cellulosic cardboard. 4,042,733, Cl. 427-391.000.

Buckeye International, Inc.: *See—*
McClurg, Carl D., 4,042,117, Cl. 213-50.500.

Buell, Halsey W.: *See—*
Abelson, Paul N.; Buell, Halsey W.; and Hallatt, William E., 4,042,559, Cl. 260-38.000.

Buenzli, Charles W., Jr., to Armstrong Cork Company. High frequency transistor ballast. 4,042,855, Cl. 315-219.000.

Bugaut, Andree: *See—*
Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, 4,042,627, Cl. 260-571.000.

Buhr, Robert K.: *See—*
Warda, Richard D.; Buhr, Robert K.; and Rehder, John E., 4,042,353, Cl. 55-99.000.

Bukac, Zbynek; and Sebenda, Jan, to Ceskoslovenska akademie ved. Preparation of polyamides by anionic polymerization with substituted triazine triones as cocatalyst. 4,042,572, Cl. 260-78.00L.

Bull, Michael J.; and Searle, Robert J. G., to Shell Oil Company. Alpha-cyano-phenoxybenzyl-isovalerates. 4,042,710, Cl. 424-304.000.

Buller, J. Stanley, to Santa Barbara Research Center. Quick cooling cryostat valve. 4,041,968, Cl. 137-74.000.

Burckhardt, Urs; and Meyer, Alfred, to Ciba-Geigy Corporation. Method of treating and preventing coccidiosis. 4,042,703, Cl. 424-273.00R.

Burdyn, Ralph F.: *See—*
Savins, Joseph George; Burdyn, Ralph F.; and Waite, Jerry M., 4,042,030, Cl. 166-273.000.

Burgdorf, Joseph Louis, to Corrugated Drum of Michigan, Inc. Container cover. 4,042,169, Cl. 229-43.000.

Burgoon, Jack L., to Scott & Fetzer Company, The. Combination sweeping-scrubbing apparatus. 4,041,567, Cl. 15-320.000.

Burroughs Wellcome Co.: *See—*
Wood, Hamish Christopher Swan; and Ohta, Kyuji, 4,042,589, Cl. 260-251.500.

Burrows, Louis H., Jr.: *See—*
Moriconi, Joseph H.; and Burrows, Louis H., Jr., 4,042,517, Cl. 252-62.10P.

Butterworth Systems Inc.: *See—*
Hatley, Kenneth John, 4,041,565, Cl. 15-200.000.

Buttke, Frederic P., to Caterpillar Tractor Co. Swingable bucket for excavators. 4,042,131, Cl. 214-138.00R.

Buus, Jorn Lasse Martin; Lassen, Niels; and Bigler, Allan Johan, to Kefalas A/S. Thiaxanthene derivatives, compositions thereof and methods of treating therewith. 4,042,695, Cl. 424-250.000.

Byk Gulden Lomberg Chemische Fabrik GmbH: *See—*
Rainer, Georg, 4,042,702, Cl. 424-273.00P.

C.A.V. Limited: *See—*
Skinner, Robert Thomas John, 4,041,920, Cl. 123-139.0AM.

C.J. Wennberg AB: *See—*
Andersson, Bengt Ivar, 4,042,477, Cl. 204/145R.

C. R. Bard, Inc.: *See—*
Barcan, Donald S., 4,042,109, Cl. 206-440.000.

Cain, Earl S.; Carlson, Jerome A.; and Goodrich, George E., to Tribotech. Pillow block. 4,042,283, Cl. 308-15.000.

Cale, Roland E., to Schaefer Manufacturing, Inc. Railway car brake rigging fulcrum lever mounting. 4,042,078, Cl. 188-231.000.

Califano, Frank L., deceased: *See—*
Stepien, George, Jr.; Califano, Frank L., deceased; DeLorenzo, William, Jr., co-executor; Gillard, G. Bruce, co-executor; Russell, Thomas E., deceased; and Russell, Florence P., executrix, 4,041,712, Cl. 61-36.00R.

California Progressive Products, Inc.: *See—*
Nininger, Nathan Vivien, Jr., 4,041,788, Cl. 74-217.00B.

Callahan, James L.; Miller, Arthur F.; and Shaw, Wilfrid G., to Standard Oil Company. Liquid dropping device. 4,042,153, Cl. 222-207.000.

Callaway, Gary R.: *See—*
Mead, Hansel B.; and Callaway, Gary R., 4,042,887, Cl. 330-53.000.

Callcott, Thomas George; and Deague, Terrence Kevin, to Broken Hill proprietary Company Limited, The. Process for the production of gaseous mixtures. 4,042,344, Cl. 48-197.00R.

Camacho, Gustavo G.; and Shackleford, Edward J. Radio-balloon distress signal. 4,042,882, Cl. 325-118.000.

Cameron, James F.: *See—*
Gregory, Charles E.; Brian, Michael; Thomas, Jerald F.; and Cameron, James F., 4,041,554, Cl. 4-10.000.

Campau, Walter Joseph: *See—*
Tomczak, Lawrence William; Crall, Frederick William; Caron, LaVerne Andrew; and Campau, Walter Joseph, 4,042,899, Cl. 336-30.000.

Campbell, Ernest E.; and Wells, William H. Vehicle for transporting and elevating articles in restricted areas. 4,042,941, Cl. 254-139.100.

Camps, Roger: *See—*
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Canadian General Electric Company Limited: *See—*
Ip, Anthony Kwok-Chun; Koyanagi, Ken; and Tarasuk, Walter Renald, 4,042,456, Cl. 176-78.000.

Canadian Patents and Development Limited: *See—*
Underhill, Edward W.; Chisholm, Melvin D.; Steck, Warren F.; Bailey, Berton K.; Lamb, Peter M.; Struble, Dean L.; and Swailes, G. Edward, 4,042,681, Cl. 424-84.000.
Warda, Richard D.; Buhr, Robert K.; and Rehder, John E., 4,042,353, Cl. 55-99.000.

Canon Kabushiki Kaisha: *See—*
Hasebe, Sadao; Ono, Hiromitsu; Murata, Minoru; and Harada, Yuji, 4,042,090, Cl. 197-102.000.
Inoue, Eiichi; Endo, Ichiro; and Yamanouchi, Teruo, 4,042,388, Cl. 96-1.600.
Yamaji, Keizo; and Kurahashi, Akira, 4,042,962, Cl. 358-300.000.

Canton Textile Mills, Inc.: *See—*
Sullins, John K., 4,042,510, Cl. 210-220.000.

Capoccia, Anastasio, to Richmond Manufacturing Company, The. Directional control mechanism for underground driven pipes and conduits. 4,042,046, Cl. 175-73.000.

Carborundum Company, The: *See—*
Abelson, Paul N.; Buell, Halsey W.; and Hallatt, William E., 4,042,559, Cl. 260-38.000.

Carden, Edward, to Medical Engineering Corporation. Bronchoscopy tube. 4,041,936, Cl. 128-6.000.

Cardiac Pacemakers, Inc.: *See—*
Anderson, Jon A.; and Kramp, Richard W., 4,041,953, Cl. 128-419.0PG.

Cardwell, Paul H.; and Kane, William S., to Deepsea Ventures, Inc. Method for separating metal constituents from ocean floor nodules. 4,042,664, Cl. 423-24.000.

Carl Schnicks & Co.: *See—*
Hammerstein, Gerd, 4,042,005, Cl. 160-220.000.

Carlson, Jerome A.: *See—*
Cain, Earl S.; Carlson, Jerome A.; and Goodrich, George E., 4,042,283, Cl. 308-15.000.

Caron, LaVerne Andrew: *See—*
Tomczak, Lawrence William; Crall, Frederick William; Caron, LaVerne Andrew; and Campau, Walter Joseph, 4,042,899, Cl. 336-30.000.

Carver, Edgar B.: *See—*
Sioui, Richard H.; and Carver, Edgar B., 4,042,346, Cl. 51-298.00A.

Cascade Corporation: *See—*
Olson, John E., 4,041,839, Cl. 91-189.00R.

Casper, William J.: *See—*
Ostrander, William M.; and Casper, William J., 4,042,068, Cl. 187-29.00R.

Cassarino, Frank V., Jr.; and Barlow, George J., to Honeywell Information Systems Inc. Logic board interlock indication apparatus. 4,042,832, Cl. 307-149.000.

Castonguay, Roger N.: *See—*
Powell, David B.; Castonguay, Roger N.; and Aitken, Donald F., 4,042,896, Cl. 335-17.000.

Caterpillar Tractor Co.: *See—*
Babbitt, John H., Jr., 4,042,261, Cl. 280-762.000.
Bianchetta, Donald L., 4,041,983, Cl. 137-625.630.
Bjerk, Roger O.; Brandon, William D.; Engleking, Frederick S.; and Jero, John P., 4,042,085, Cl. 192-57.000.
Brownell, Roy D., 4,041,976, Cl. 137-351.000.
Buttke, Frederic P., 4,042,131, Cl. 214-138.00R.
Clark, Ralph B., 4,041,804, Cl. 74-711.000.
Fisher, George A.; and Richardson, Warner G., 4,041,625, Cl. 37-126.0AE.
Fryrear, Max Dennis, 4,041,624, Cl. 37-117.500.
Goloff, Alexander; and Sommars, Mark Frederick, 4,041,803, Cl. 74-574.000.
Habiger, Cyril W., 4,041,702, Cl. 60-431.000.
Hakes, Dewey R., 4,042,215, Cl. 254-187.400.
Haslett, Glenn M.; and Blunier, Dennis L., 4,042,282, Cl. 305-11.000.
Herr, Charles H., 4,041,807, Cl. 74-752.00C.
Latimer, Eugene E.; and Waggoner, John B., 4,042,508, Cl. 210-172.000.
Loebs, Richard G.; and Ostrowski, Richard C., 4,042,204, Cl. 249-57.000.
Miller, Calvin L., 4,041,792, Cl. 74-405.000.
Waggoner, John B., 4,042,505, Cl. 210-132.000.

Caulfield, Patrick J.; Diesch, Robert E.; and Strunc, Gerald R., to Pako Corporation. Closed loop feedback digital system for exponentially varying signal frequency. 4,042,973, Cl. 235-150.300.

Cavitron Corporation: *See—*
Weiss, Steven N.; and Broadwin, Alan, 4,041,947, Cl. 128-276.000.

CBS Inc.: *See—*
Hoel, Per O.; Korpijaakko, Erkki Pekka; and Moustakas, Matthew A., 4,042,243, Cl. 273-108.000.

Cecchetti, Claudio. Game playing structure particularly soccer game structure. 4,042,239, Cl. 273-85.00F.
Celanese Corporation: *See*—
Collins, George L.; and Costanza, John R., 4,042,476, Cl. 204-159.150.
Davis, Gerald A.; and Stackman, Robert W., 4,042,618, Cl. 260-470.000.
DeEdwardo, Andrew H.; Zitomer, Fred; Stackman, Robert W.; and Kramer, Charles E., 4,042,561, Cl. 260-45.9NP.
Cella, Alexander. Battery quick disconnect system. 4,042,759, Cl. 429-121.000.
Central Glass Co., Ltd.: *See*—
Maeda, Takeshi; and Okino, Seiki, 4,042,363, Cl. 65-60.00R.
Ozawa, Masahiro; Komatsu, Tadaaki; and Matsuoka, Kimiaki, 4,042,638, Cl. 260-653.10R.
Yoshinaga, Mituji, 4,042,556, Cl. 260-2.50P.
Centre de Recherches Metallurgiques-Centrum voor Research in de Metallurgie: *See*—
Ramelot, Daniel Leon, 4,042,378, Cl. 75-60.000.
Centre d'Etudes Pour l'Industrie Pharmaceutique: *See*—
Jacquier, Robert R., 4,042,590, Cl. 260-268.00R.
Cerne, Gerd, to Vereinigte Flugtechnische Werke-Fokker GmbH. Safety device for aircraft doors or hatches. 4,042,193, Cl. 244-129.100.
Ceskoslovenska akademie ved: *See*—
Bukac, Zbynek; and Sebenda, Jan, 4,042,572, Cl. 260-78.00L.
Cestaro, John P.; Hebbar, Ranna K.; and Sokolov, Uriel S., to N L Industries, Inc. Recovery of metallic lead, lead compounds and plastic material from scrap storage batteries. 4,042,177, Cl. 241-20.000.
Champenois, Paul, to Verreries Mecaniques Champenoises. Conveyor installation for the treatment and transport of glass articles. 4,042,365, Cl. 65-260.000.
Champion International Corporation: *See*—
Ashbrook, Walter L., 4,041,823, Cl. 83-478.000.
D'Alessio, Joseph R., 4,042,167, Cl. 229-34.0HW.
Chan, Louis Yc., to Signetics Corporation. Universal differential line driver integrated circuit. 4,042,840, Cl. 307-270.000.
Chaney, Emsley M.: *See*—
Chaney, Ray Cwen; and Chaney, Emsley M., 4,041,678, Cl. 56-10.700.
Chaney, Ray Owen; and Chaney, Emsley M. Short turn vehicle. 4,041,678, Cl. 56-10.700.
Chang, Chi-Haung: *See*—
Hauldren, H. Morris; Claycomb, Jack R.; Chang, Chi-Haung; and DeKerlegand, Deke E., 4,041,773, Cl. 73-67.80S.
Chang, Christopher Teh-Min, to Texas Instruments Incorporated. Magnetic bubble track crossover element. 4,042,916, Cl. 340-174.0TF.
Chang, Mike F., to General Electric Company. Post TGZM surface etch. 4,042,448, Cl. 156-650.000.
Chapa, Lucio, III. Corn detasseler. 4,041,681, Cl. 56-63.000.
Chapman, John J.: *See*—
Baker, William C.; and Chapman, John J., 4,041,757, Cl. 73-202.000.
Chappel, Barry H. Jewelry clasp and method of making same. 4,041,579, Cl. 24-230.0AK.
Charles, James H. Pivoted guide means for selective immersion of web feed. 4,041,900, Cl. 118-419.000.
Chas. S. Tanner Co.: *See*—
Lindemann, Martin K., 4,042,553, Cl. 260-29.60H.
Chartet, Andre, to Societe Anonyme des Usines Chausson. Brazed core radiator in aluminum alloy and added header boxes. 4,041,594, Cl. 29-157.30C.
Chay, Dong Myung, to Du Pont de Nemours, E. I., and Company. Foaming agents for galvanizing fluxes. 4,042,731, Cl. 427-311.000.
Chayes, Norman Chanine, to Combustion Engineering, Inc. Spacer arrangement for steam generator. 4,041,907, Cl. 122-510.000.
Chedid, Louis: *See*—
Ciorbaru, Rita, born Sfartz; Adam, Arlette, born Chosson; Petit, Jean-Francois; Lederer, Edgar; Damais, Chantal, born Rousselot; Chedid, Louis; and Bona, Constantin, 4,042,678, Cl. 424-12.000.
Chemical Construction Corporation: *See*—
Cook, Lucien H., 4,042,626, Cl. 260-555.00A.
Chensky, Frank T. Wall plate structure. 4,042,292, Cl. 339-45.00R.
Cheradame, Guy: *See*—
Bouy, Pierre; and Cheradame, Guy, 4,042,483, Cl. 204-290.00F.
Chevron Research Company: *See*—
Bacskai, Robert, 4,042,573, Cl. 260-78.00P.
Chezem, Jimmie A. Wedge-type limit stop for outward opening door. 4,042,265, Cl. 292-262.000.
Chiba, Akio: *See*—
Tomita, Sadami; and Chiba, Akio, 4,042,898, Cl. 335-297.000.
Chicago Metallic Corporation: *See*—
Jahn, Martin D.; and Balfanz, Glenn F., Jr., 4,041,668, Cl. 52-489.000.
Chicago Pneumatic Tool Company: *See*—
Tooley, Earl C., 4,042,062, Cl. 181-36.00A.
Chihara, Hiroyuki; and Okada, Yasushi, to Kabushiki Kaisha Suwa Seikosha. Electronic timepiece battery monitoring circuit. 4,041,691, Cl. 58-23.0BA.
Chinoin Gyogyszer es Vegyeszeti Termekek Gyara RT: *See*—
Zimmermann nee Ignacz, Zsuzsanna; and Gepesz, Robert, 4,042,719, Cl. 426-573.000.
Chisholm, Melvin D.: *See*—
Underhill, Edward W.; Chisholm, Melvin D.; Steck, Warren F.; Bailey, Berton K.; Lamb, Peter M.; Struble, Dean L.; and Swailes, G. Edward, 4,042,681, Cl. 424-84.000.
Chiu, Shui Tung; and Kaneko, Tatsuhei, to Borden, Inc. Vinyl modified lignocellulosic particles for coating panels. 4,042,728, Cl. 427-212.000.
Chladek, Otokar: *See*—
Brada, Pavel; Kucera, Jaromir; Chladek, Otokar; Voda, Gustav; Novacek, Jindrich; and Kollmann, Jan, 4,041,733, Cl. 66-138.000.
Chlorella Industry Co., Ltd.: *See*—
Itanami, Kojiro; and Ishizaki, Masanori, 4,041,640, Cl. 47-1.400.
Chloride Silent Power Limited: *See*—
Jones, Ivor Wynn, 4,042,757, Cl. 429-104.000.
Christ, Alfred: *See*—
Dolenc, Anton; Christ, Alfred; and Lehmann, Rolf, 4,041,752, Cl. 72-201.000.
Chrysler Corporation: *See*—
Tomczak, Lawrence William; Crall, Frederick William; Caron, LaVerne Andrew; and Campau, Walter Joseph, 4,042,899, Cl. 336-30.000.
Chu, Chang K.; Hower, Philip L.; and Vomish, George W., to Westinghouse Electric Corporation. High voltage transistor with high gain. 4,042,947, Cl. 357-34.000.
Chu, Paul; Weiskopf, Gunther; and Saunders, Lawrence J., to S&S Corrugated Paper Machinery Co., Inc. Lead-in device for bi-level slitter. 4,041,819, Cl. 83-302.000.
Chuo Hatsujo Kogyo Co., Ltd.: *See*—
Takeuchi, Kazuaki, 4,042,198, Cl. 248-62.000.
Chviruk, Vladimir Petrovich; Koneva, Nina Vasilievna; Kilkinov, Alexandr Afanasievich; Demin, Alexandr Viktorovich; Shipkov, Nikolai Nikolaevich; Kosinsky, Konstantin Alexeevich; Kamarian, Georgy Mikirtychevich; Nemirovsky, Ernest Elizarovich; and Samokhin, Igor Nikolaevich. Graphite-base filling material for the decomposition of alkali metal amalgams and method of producing same. 4,042,656, Cl. 264-29.500.
Ciaraldi, Anthony: *See*—
Wilder, Leslie N.; and Ciaraldi, Anthony, 4,041,890, Cl. 116-114.00R.
Ciba-Geigy AG: *See*—
Ade, Frank, 4,041,897, Cl. 118-300.000.
Becker, Carl; Wegmann, Jacques; and Schaub, Andres, 4,042,320, Cl. 8-39.00C.
Defago, Raymond; Lapple, Arnulf Ruediger; and Becker, Carl, 4,042,545, Cl. 260-13.000.
Ciba-Geigy Corporation: *See*—
Bowman, Robert Mathews, 4,042,701, Cl. 424-267.000.
Burckhardt, Urs; and Meyer, Alfred, 4,042,703, Cl. 424-273.00R.
Falk, Robert A., 4,042,522, Cl. 252-8.050.
Rys, Paul; and Vogelsanger, Rolf, 4,042,635, Cl. 260-623.00D.
Winter, Roland A. E., 4,042,649, Cl. 260-927.00R.
Cintron, Carlos U. Automobile trunk guard. 4,041,741, Cl. 70-417.000.
Ciorbaru, Rita, born Sfartz; Adam, Arlette, born Chosson; Petit, Jean-Francois; Lederer, Edgar; Damais, Chantal, born Rousselot; Chedid, Louis; and Bona, Constantin, to Agence Nationale de Valorisation de la Recherche (ANVAR). Water-soluble agents having mitogenic properties obtained from nocardia cells, and processes for the preparation thereof. 4,042,678, Cl. 424-12.000.
Cislo, Casimer J., to General Motors Corporation. Torsion bar mounting arrangement. 4,042,258, Cl. 280-664.000.
Citelli, Charles. Braking system. 4,042,076, Cl. 188-80.000.
Citizen Watch Company Limited: *See*—
Yasuda, Tetuya; Iinuma, Yoshio; and Maekawa, Yuzo, 4,042,861, Cl. 361-400.000.
Clampitt, Bert Howard; and Havens, Richard Harry, to Gulf Research & Development Company. Photodegradable resin compositions. 4,042,763, Cl. 526-4.000.
Clark, Leonard R.; and Meehl, David W., to Standard Pressed Steel Co. Storage system. 4,042,097, Cl. 211-182.000.
Clark, Philip M.: *See*—
Rubinstein, Herbert J.; Gordon, Clark B.; Robison, Albert; and Clark, Philip M., 4,042,828, Cl. 250-507.000.
Clark, Ralph B., to Caterpillar Tractor Co. Limited slip differential with clutch control means. 4,041,804, Cl. 74-711.000.
Clarke, Peter Alec: *See*—
Molins, Desmond Walter; Hinchcliffe, Dennis; Clarke, Peter Alec; and Heybourn, Frank, 4,042,112, Cl. 209-73.000.
Claycomb, Jack R.: *See*—
Hauldren, H. Morris; Claycomb, Jack R.; Chang, Chi-Haung; and DeKerlegand, Deke E., 4,041,773, Cl. 73-67.80S.
Clement, Andrew B. Mixer. 4,042,222, Cl. 259-176.000.
Clement, Pierre L., to Eastman Kodak Company. Integral element for analysis of liquids. 4,042,335, Cl. 23-253.0TP.
Clerici, Mario: *See*—
Perrotti, Emilio; and Clerici, Mario, 4,042,609, Cl. 260-429.00R.
Clinch, Colin W. F.; James, Peter A. R.; and Tibbett, John H., to ITW Limited. Seals. 4,042,267, Cl. 292-318.000.
Clinton, Henry H. Collapsible speaker assembly. 4,042,778, Cl. 179-1.00E.
Clorox Company, The: *See*—
Bernard, Brian C., 4,042,343, Cl. 44-10.00B.
Clupak, Inc.: *See*—
Groome, Ernest J., 4,042,437, Cl. 156-212.000.
Coach and Car Equipment Corporation: *See*—
Harder, Arthur J., Jr., 4,042,663, Cl. 264-45.700.
Coal Industry (Patents) Ltd.: *See*—
Haskew, Francis Anthony, 4,041,841, Cl. 91-421.000.

Cobb, A. Donn, to United States of America, Navy. Hydroways. 4,042,904, Cl. 340-6.00R.
Cockrell, Charles R., to Combustion Engineering, Inc. Schnabel-type car. 4,041,879, Cl. 105-366.00R.
Codorniu, Francisco Lorente: *See—*
Johansson, Arne Boris; Codorniu, Francisco Lorente; and Strandly, Ingvald, 4,041,989, Cl. 139-425.00A.
Coffinberry, George A.; and Kast, Howard B., to United States of America, National Aeronautics and Space Administration. Oil cooling system for a gas turbine engine. 4,041,697, Cl. 60-39.28R.
Coglan, George Albert Carl. Latch or lock set and method of manufacture thereof. 4,042,268, Cl. 292-347.000.
Cohen, Morris. Waistband. 4,041,551, Cl. 2-236.000.
Cohen, Richard Lewis; and Meek, Ronald Lee, to Bell Telephone Laboratories, Incorporated. Process for electroless plating using separate sensitization and activation steps. 4,042,730, Cl. 427-305.000.
Cole, David F.; and Sutcliffe, Walter. Marine holding tank. 4,041,555, Cl. 4-10.000.
Cole, Kenneth I. Spare wheel carrier. 4,042,158, Cl. 224-42.230.
Coleman, Edward, to Ottermill Limited. Multi-pole circuit breaker system with common trip means. 4,042,894, Cl. 335-9.000.
Colgate-Palmolive Company: *See—*
Gaffar, Abdul, 4,042,679, Cl. 424-54.000.
Collette, Robert P.; and Wheeler, Robert C., to GTE Sylvania Incorporated. Television receiver protection circuit. 4,042,858, Cl. 315-379.000.
Collin, Per Harald, to Stora Kopparbergs Bergslags Aktiebolag. Method for carrying out endothermic reduction processes in a circulating fluid bed and an apparatus therefor. 4,042,376, Cl. 75-26.000.
Collins, Copp. Elastic cord-attached returning soccer ball. 4,042,241, Cl. 273-95.00A.
Collins, Frederick H., to Valcour Imprinted Papers, Inc. Method for making packaging particles and resulting product. 4,042,658, Cl. 264-45.500.
Collins, George L.; and Costanza, John R., to Celanese Corporation. Polymerized titanium dioxide for ultraviolet coatings. 4,042,476, Cl. 204-159.150.
Collins Machinery Corporation: *See—*
Elkin, Robert D., 4,041,747, Cl. 72-105.000.
Colorado Seminary: *See—*
Ruud, Clayton O., 4,042,825, Cl. 250-272.000.
Columbia Ribbon and Carbon Manufacturing Co., Inc.: *See—*
Newman, Douglas A.; and Emerson, Robert T., 4,042,401, Cl. 106-14.500.
Newman, Douglas A.; and Schlotzhauer, Allan T., 4,042,744, Cl. 428-307.000.
Columbia Ribbon and Manufacturing Co., Inc.: *See—*
Newman, Douglas A., 4,042,092, Cl. 197-171.000.
Columbus McKinnon Corporation: *See—*
Schreyer, Kenneth D.; Leverentz, Earl T.; and Nusz, Thomas R., 4,042,213, Cl. 254-168.000.
Columbus, Richard L., to Eastman Kodak Company. Gas pressure-activated drop dispenser. 4,041,995, Cl. 141-275.000.
Combotronics, Inc.: *See—*
Main, Don R., 4,042,149, Cl. 222-40.000.
Combustion Engineering, Inc.: *See—*
Baker, Roxton Elliott, 4,042,889, Cl. 330-207.00P.
Chayes, Norman Chanine, 4,041,907, Cl. 122-510.000.
Cockrell, Charles R., 4,041,879, Cl. 105-366.00R.
Commonwealth Scientific and Industrial Research Organization: *See—*
Rawlings, Robert M.; and Procter, Donald, 4,042,718, Cl. 426-573.000.
Compagnie Honeywell Bull: *See—*
Donabin, Claude Jules; and Mercier, Denis L. J. G., 4,042,807, Cl. 235-61.11R.
Compagnie Industrielle des Telecommunications Cit-Alcatel: *See—*
Parent, Guy, 4,042,930, Cl. 343-113.00R.
Compax Corporation: *See—*
Diggle, Edmund A., Jr., 4,041,581, Cl. 26-18.600.
Compo Industries, Inc.: *See—*
Hardy, Henry; and Balfour, Adrian E., 4,042,433, Cl. 156-87.000.
Composite Structures Corporation: *See—*
Theriault, Maurice N., 4,042,238, Cl. 273-73.00C.
Compton, James B.; and Ochi, Sam S., to National Semiconductor Corporation. Field effect transistor switch. 4,042,836, Cl. 307-251.000.
Consumer Tire & Supply Co., Inc.: *See—*
Taich, Albert; and Gill, Theodore, 4,041,772, Cl. 73-45.600.
Conti, Jack, to Dresser Industries, Inc. Prepackaged guard device sub-assembly for pressure responsive instruments. 4,041,761, Cl. 73-420.000.
Continental Can Co., Inc.: *See—*
Rarey, Kenneth W.; Higgins, Edward D.; Hungerford, Donald L.; and Kennedy, John B., Jr., 4,041,901, Cl. 118-621.000.
Continental Oil Company: *See—*
Starks, Charles M., 4,042,631, Cl. 260-593.00H.
Waters, Kenneth H., 4,042,063, Cl. 181-119.000.
Control Drug, Inc.: *See—*
Dewas, Raymond, 4,041,991, Cl. 139-449.000.
Gans, Arnold M.; Goren, Alvin J.; and Gorenberg, Eli M., 4,042,687, Cl. 424-177.000.
Gans, Arnold M.; Goren, Alvin J.; and Gorenberg, Eli M., 4,042,688, Cl. 424-177.000.
Control Products Inc.: *See—*
Dacal, Perfecto, 4,042,819, Cl. 240-51.11R.
Conway, Bernard W.; and Moran, James, to Dexter Corporation, The. Tufted nonwoven fibrous web. 4,042,453, Cl. 162-108.000.
Cook, Harold L., Jr.; and Geer, Ernest C., to Transco Energy Company. Method for increasing the recovery of natural gas from a geo-pressured aquifer. 4,042,034, Cl. 166-314.000.
Cook, Lucien H., to Chemical Construction Corporation. Integrated two-stage urea synthesis. 4,042,626, Cl. 260-555.00A.
Cook, Stephen Olney, to Crown Zellerbach Corporation. Method and apparatus for forming tubular multilaminate plastic film. 4,042,661, Cl. 264-173.000.
Cooksey, Jonathan Norton. Composite fireplace construction. 4,041,929, Cl. 126-120.000.
Coombs, Robert V., to Sandoz, Inc. Benzindazoles. 4,042,704, Cl. 424-273.00P.
Coons, Robert Arthur: *See—*
Johnson, Robert Richard; Coons, Robert Arthur; and Zwald, John Andrew, 4,041,766, Cl. 72-402.000.
Cooper, Glenn Dale: *See—*
Bennett, James Gordy, Jr.; and Cooper, Glenn Dale, 4,042,564, Cl. 260-47.0ET.
Cooper, Jack A., to Lear Siegler, Inc. Easily accessible switches for manual control of an automatically controlled vehicle. 4,042,058, Cl. 180-98.000.
Cope, Charles S.; and Couture, Maurice J., to Du Pont de Nemours, E. I., and Company. Fluorocarbon separation process. 4,042,634, Cl. 210-616.000.
Coratomic, Inc.: *See—*
Purdy, David L.; Speicher, Vernon L.; Shipko, Frederick J.; and Johnson, William L., 4,041,956, Cl. 128-419.00P.
Corbin, Thomas F., Jr.; Eskridge, Brewster B.; and Lyon, Boyce M., to Akzona Incorporated. Continuous melt spinning and drawing of nylon 6 yarn, while reducing the liveliness of the yarn. 4,042,662, Cl. 264-210.00F.
Corco, Inc.: *See—*
Croley, Thomas E., 4,042,164, Cl. 229-23.0BT.
Cordes, Horst: *See—*
Decker, Hanns; Pfeiffer, Roland; Wenz, Lothar; and Cordes, Horst, 4,042,492, Cl. 209-223.00R.
Cornell Research Foundation, Inc.: *See—*
Brice, Neil M., 4,042,196, Cl. 244-158.000.
Cornell, Robert J., to Uniroyal, Inc. Latex suspension process and graft polyblend composition using small particle size spine. 4,042,647, Cl. 260-880.00R.
Corning Glass Works: *See—*
Bihuniak, Peter P.; Brandes, Lewis H.; and Guile, Donald L., 4,042,361, Cl. 65-18.000.
Folmar, Robert G.; and Weetman, Ronald J., 4,041,597, Cl. 29-423.000.
Gulati, Suresh T., 4,042,738, Cl. 428-116.000.
Kelm, Everett F., 4,041,592, Cl. 29-157.30R.
MacDowell, John F.; and Rittler, Hermann L., 4,042,362, Cl. 65-33.000.
Noll, Dale A.; Piazza, Giacomo J.; and Young, Robert L., 4,041,591, Cl. 29-157.30R.
Reade, Richard F., 4,042,403, Cl. 106-39.700.
Schultz, Peter C., 4,042,404, Cl. 106-52.000.
Cornwell, Charles E.; and Plunguian, Mark. Cementitious sound absorbing panels and sound absorbing sprayed wall structures. 4,042,745, Cl. 428-310.000.
Corrugated Drum of Michigan, Inc.: *See—*
Burgdorf, Joseph Louis, 4,042,169, Cl. 229-43.000.
Costanza, John R.: *See—*
Collins, George L.; and Costanza, John R., 4,042,476, Cl. 204-159.150.
Coster, Norbert, to SOFISA (Societe Financiere S.A.). Thrust bearing assembly. 4,042,284, Cl. 308-219.000.
Coulmance, Jean-Pierre Rene; and Six, Jean-Claude Gerard, to U.S. Philips Corporation. Temperature transducer arrangement which supplies threshold voltages with the aid of a single sensor. 4,042,875, Cl. 323-75.00N.
Coulter Electronics, Inc.: *See—*
Drbal, Vladimir J., 4,042,152, Cl. 222-137.000.
Couture, Maurice J.: *See—*
Cope, Charles S.; and Couture, Maurice J., 4,042,634, Cl. 210-616.000.
Cowen, John F.: *See—*
Barrick, Robert R., 4,041,925, Cl. 124-35.00A.
Cox, Clyde H. Sludge dewatering. 4,041,854, Cl. 100-112.000.
Cox, Jay Ashton, to Guldon Industries, Inc. Phase locked firing circuit for SCRS, or the like. 4,042,873, Cl. 363-129.000.
Coy, Merle Dalton, to Borg-Warner Corporation. Method of manufacturing a transmission. 4,041,791, Cl. 74-325.000.
Crall, Frederick William: *See—*
Tomczak, Lawrence William; Crall, Frederick William; Caron, LaVerne Andrew; and Campau, Walter Joseph, 4,042,899, Cl. 336-30.000.
Craven, Peter Graham; and Gerzon, Michael Anthony, to National Research Development Corporation. Coincident microphone simulation covering three dimensional space and yielding various directional outputs. 4,042,779, Cl. 179-1.0DM.
CRC - Automatic Welding, Division of Crutcher Resources Corporation: *See—*
Kopczynski, John F.; and Kluczynski, Paul F., 4,042,231, Cl. 269-48.100.
Creasey, Norman Geoffrey; and Pike, Leslie Clark, to Imperial Chemi-

cal Industries Limited. Organopolysiloxane compositions. 4,042,643, Cl. 428-447.000.

Criley, Ronald L.: *See—*
Frost, Richard H.; and Criley, Ronald L., 4,042,194, Cl. 244-151.00A.

Croley, Thomas E., to Corco, Inc. Container end structure. 4,042,164, Cl. 229-23.0BT.

Crown Zellerbach Corporation: *See—*
Cook, Stephen Olney, 4,042,661, Cl. 264-173.000.

Crum, Robert L., to Fiat-Allis Construction Machinery, Inc. Track link hinge joint lubricating system. 4,042,065, Cl. 184-1.00E.

Cueman, Glenn F.: *See—*
Frankel, S. Arthur; and Cueman, Glenn F., 4,041,940, Cl. 128-80.00C.

Cumpston, Edward H. Rotor for mixer-refiner-reactor. 4,042,183, Cl. 241-292.100.

Cunningham, James D.: *See—*
Smith, James E.; and Cunningham, James D., 4,042,036, Cl. 173-13.000.

Curley, John L.; Dawson, C. William; Parmet, Arthur A.; and Taylor, Donald R., to Honeywell Information Systems Inc. Microprogrammed control of foreign processor control functions. 4,042,914, Cl. 364-200.000.

Cuvilly, Jean-Pierre, to Kalinna, E. Ceiling equipment for demonstration equipment. 4,041,658, Cl. 52-39.000.

Czechoslovenska akademie ved: *See—*
Hrabak, Frantisek; Hynkova, Vlasta; and Lokaj, Jan, 4,042,644, Cl. 260-849.000.

Czitrom, Georg, to Aneta Belysning AB. Lighting device. 4,042,290, Cl. 339-52.00R.

Dacal, Perfecto, to Control Products Inc. Fluorescent lamp for use in explosive atmospheres such as mines. 4,042,819, Cl. 240-51.11R.

Daglis, Nicholas T. Tone enhancing device for reed type musical instruments. 4,041,827, Cl. 84-383.00R.

D'Agnolo, Armando; and Minto, Luigi, to Officine Savio, S.p.A. Intermediate storage points for cops, and the intermediate storage points thus improved. 4,042,098, Cl. 198-393.000.

Dahlgren, Harold P.; and Dahlgren, Harvey W., to Dahlgren Manufacturing Company. Method and apparatus for inking printing plates. 4,041,864, Cl. 101-350.000.

Dahlgren, Harvey W.: *See—*
Dahlgren, Harold P.; and Dahlgren, Harvey W., 4,041,864, Cl. 101-350.000.

Dahlgren Manufacturing Company: *See—*
Dahlgren, Harold P.; and Dahlgren, Harvey W., 4,041,864, Cl. 101-350.000.

Dahlin, Rolf Brorsson. Balancing apparatus, preferably for grinding wheel. 4,041,802, Cl. 74-573.000.

Dahm, Manfred; and Gonzalez-Dorner, Alberto Carlos, to Bayer Aktiengesellschaft. Process for the production of polyurethane foams. 4,042,537, Cl. 260-2.5AP.

Dahm, Manfred: *See—*
von Bonin, Wulf; Preis, Lothar; von Gizycki, Ulrich; and Dahm, Manfred, 4,042,558, Cl. 260-37.00N.

Dai Nippon Printing Co., Ltd.: *See—*
Takamizawa, Minoru; Yamamoto, Yasushi; Inoue, Yoshio; Noshiro, Atsumi; and Fujii, Hitoshi, 4,042,613, Cl. 260-448.20B.

Daihatsu Motor Company, Limited: *See—*
Morita, Eiichi; Sato, Hisayuki; and Kobayashi, Toru, 4,042,866, Cl. 318-568.000.

Daimler-Benz Aktiengesellschaft: *See—*
Breitschwerdt, Werner, 4,042,276, Cl. 297-216.000.
Razim, Claus; Lovasz, Csaba; and Baier, Kurt, 4,042,427, Cl. 148-15.500.
Wiegard, Klaus, 4,042,015, Cl. 165-8.000.

Daiwa Boseki Kabushiki: *See—*
Motobayashi, Kozo; Shimizu, Takeshi; and Miyamoto, Noriaki, 4,041,687, Cl. 57-56.000.

D'Alessio, Joseph R., to Champion International Corporation. Die cut blank and tray assembled therefrom. 4,042,167, Cl. 229-34.0HW.

Damais, Chantal, born Rousselot: *See—*
Ciorbaru, Rita, born Sfartz; Adam, Arlette, born Chosson; Petit, Jean-Francois; Lederer, Edgar; Damais, Chantal, born Rousselot; Chedid, Louis; and Bona, Constantin, 4,042,678, Cl. 424-12.000.

Dana Corporation: *See—*
Dickenson, William D., 4,042,073, Cl. 188-72.900.
Kress, Robert F., 4,041,730, Cl. 64-30.00D.

D'Angelo, Joseph J.; and D'Angelo, Joseph J., Jr. Pneumatically operated stapling apparatus and method. 4,041,598, Cl. 29-432.000.

D'Angelo, Joseph J., Jr.: *See—*
D'Angelo, Joseph J.; and D'Angelo, Joseph J., Jr., 4,041,598, Cl. 29-432.000.

Darling, Reyi: *See—*
Darling, Stanley N.; and Darling, Reyi, 4,041,556, Cl. 4-52.000.

Darling, Stanley N.; and Darling, Reyi. Flushing method and apparatus. 4,041,556, Cl. 4-52.000.

Dart Industries, Inc.: *See—*
Stenberg, Nyyrikki K., 4,041,758, Cl. 73-207.000.

Data General Corporation: *See—*
Gruner, Ronald Hans; and Alsing, Carl Justin, 4,042,972, Cl. 364-200.000.

Data Packaging Corporation: *See—*
Lyman, George F., 4,041,627, Cl. 40-97.000.

Davidsohn, Uryon S., to Motorola, Inc. Semiconductor devices. 4,042,949, Cl. 357-49.000.

Davis, Duane A.; and Krenick, Michael P., to GAF Corporation. Method for perforating roofing sheet material. 4,041,815, Cl. 83-30.000.

Davis, George Bradley, Jr. Joist, structural element and devices used in making same. 4,041,664, Cl. 52-223.00R.

Davis, Gerald A.; and Stackman, Robert W., to Celanese Corporation. Aromatic sulfonates. 4,042,618, Cl. 260-470.000.

Davis, James W.; and Hilton, Garrett H., to Fischer & Porter Co. Ejector assembly. 4,041,981, Cl. 137-604.000.

Davis, John W., to Radar Control Systems Corporation. Doppler radar module employing coupled rectangular waveguides. 4,042,934, Cl. 343-786.000.

Davis, Leonard Mayor: *See—*
Pakenham, William Edward; and Davis, Leonard Mayor, 4,042,792, Cl. 179-90.00R.

Davis, Michael Ian: *See—*
Birney, Richard Eugene; Davis, Michael Ian; Graybiel, Lynn Allan; Hood, Robert Allen; Kahn, Samuel; and Osborne, William Steese, 4,042,913, Cl. 364-200.000.

Davis, Walter C.: *See—*
Brandewie, Richard A.; Davis, Walter C.; and Macken, John A., 4,042,822, Cl. 250-216.000.

Dawson, C. William: *See—*
Curley, John L.; Dawson, C. William; Parmet, Arthur A.; and Taylor, Donald R., 4,042,914, Cl. 364-200.000.

De Laval Separator Company, The: *See—*
Yang, Denis C., 4,041,904, Cl. 119-14.410.

Deague, Terrence Kevin: *See—*
Callcott, Thomas George; and Deague, Terrence Kevin, 4,042,344, Cl. 48-197.00R.

De Araujo, Manuel Alexandre Vincent; and Vouthier, Marcel, to De Araujo, Manuel Alexandre Vincent. Electric safety switch with positive-action mechanism. 4,042,797, Cl. 200-153.00R.

Decker, Hanns; Pfeiffer, Roland; Wenz, Lothar; and Cordes, Horst, to Klockner-Humboldt-Deutz Aktiengesellschaft. Apparatus for the separation of magnetizable particles from a fine granular solid. 4,042,492, Cl. 209-223.00R.

Decker, Louise A.; and Langford, Gary O., to United States of America, Navy. Optical scanner. 4,042,823, Cl. 250-227.000.

DeEdwardo, Andrew H.; Zitomer, Fred; Stackman, Robert W.; and Kramer, Charles E., to Celanese Corporation. Flame retardant compositions containing polyphosphazenes. 4,042,561, Cl. 260-45.9NP.

Deeg, Emil W.: *See—*
Krohn, David A.; Graf, Robert E.; and Deeg, Emil W., 4,042,405, Cl. 106-52.000.

Deep Sea Grouting Packers, Inc.: *See—*
Stone, William Bundy, 4,041,718, Cl. 61-86.000.

Deepsea Ventures, Inc.: *See—*
Cardwell, Paul H.; and Kane, William S., 4,042,664, Cl. 423-24.000.

Deere & Company: *See—*
Honnold, Darrel Lee, 4,042,044, Cl. 172-311.000.

Defago, Raymond; Lapple, Arnulf Ruediger; and Becker, Carl, to Ciba-Geigy AG. Novel printing inks for sublimation transfer printing. 4,042,545, Cl. 260-13.000.

Defibrator AB: *See—*
Falkinger, Willard; and Asberg, Per Anders, 4,042,125, Cl. 214-6.0BA.

Degen, Ludwig: *See—*
Marconi, Walter; Oddo, Nicola; and Degen, Ludwig, 4,042,495, Cl. 210-11.000.

Degen, Norbert: *See—*
Simon, Michael; and Degen, Norbert, 4,041,877, Cl. 104-242.000.

Dehnert, Johannes; and Lamm, Gunther, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Azo dyes having 2,6-diaminopyridine derivatives as coupling components. 4,042,578, Cl. 260-156.000.

DeKerlegand, Deke E.: *See—*
Hauldren, H. Morris; Claycomb, Jack R.; Chang, Chi-Haung; and DeKerlegand, Deke E., 4,041,773, Cl. 73-67.80S.

Del Norte Technology, Inc.: *See—*
Merrick, James W., 4,042,923, Cl. 343-6.5LC.

Delamere & Williams Company Limited: *See—*
Brooke, Arthur Alan; and Loben, Rudy, 4,041,673, Cl. 53-39.000.

Delarge, Jacques E.; Lapiere, Charles L.; and Georges, Andre H., to A. Christiaens Societe Anonyme. Derivatives of 1,2,4-thiadiazine. 4,042,693, Cl. 424-246.000.

Delkor Industries, Inc.: *See—*
Klund, Robert N.; and Weidenbach, James S., 4,042,445, Cl. 156-385.000.

Dell, Curtis G.; and Williamson, James A., Jr., to Du Pont de Nemours, E. I., and Company. Apparatus and method for gas analysis. 4,042,333, Cl. 23-232.00R.

Delle-Alsthom: *See—*
Kypreos, Georges; and Orgeret, Lucien, 4,042,968, Cl. 361-60.000.

Delmar Chemicals Limited: *See—*
Dunne, Gerald J.; and Harvey, John D., 4,042,722, Cl. 426-648.000.

DeLorenzo, William, Jr., co-executor: *See—*
Stepien, George, Jr.; Califano, Frank L., deceased; DeLorenzo, William, Jr., co-executor; Gillard, G. Bruce, co-executor; Russell, Thomas E., deceased; and Russell, Florence P., executrix, 4,041,712, Cl. 61-36.00R.

Demaray, Merlin E.; and Attridge, Russell G., Jr., to Ranco Incorporated. Method and apparatus for controlling air-conditioning systems. 4,042,013, Cl. 165-2.000.

De Meo, Edgar: *See—*
Hazeltine, Barrett; De Meo, Edgar; and Simon, Richard M., 4,042,491, Cl. 209-74.00R.

Demin, Alexandr Viktorovich: *See—*
Chviruk, Vladimir Petrovich; Koneva, Nina Vasilievna; Kilkinov, Alexandr Afanasievich; Demin, Alexandr Viktorovich; Shipkov, Nikolai Nikolaevich; Kosinsky, Konstantin Alexeevich; Kamarian, Georgy Mikirtychevich; Nemirovsky, Ernest Elizarovich; and Samokhin, Igor Nikolaevich, 4,042,656, Cl. 264-29.500.
Dems, Edd: *See—*
Harsch, Thomas B.; and Dems, Edd, 4,042,920, Cl. 340-324.00M.
de Munck, Eduard H. L., to Vredestein N.V. Injection sealable waterstop and method of installing same. 4,041,665, Cl. 52-396.000.
Dench, Robert H.; and Dervin, Victor J., to Mobile Product Services, Inc. Produce warmer. 4,042,017, Cl. 165-63.000.
Dentsply Research & Development Corporation: *See—*
Bresnahan, Robert A.; Bass, Edward W.; and Mader, William G., 4,041,609, Cl. 32-22.000.
Depoorter, Henri: *See—*
Moelants, Felix Jan; Dierckx, Jozef Aime; and Depoorter, Henri, 4,042,397, Cl. 96-84.00R.
Dervin, Victor J.: *See—*
Dench, Robert H.; and Dervin, Victor J., 4,042,017, Cl. 165-63.000.
Des Champs Laboratories Incorporated: *See—*
Zebuhr, William Henry, 4,042,018, Cl. 165-166.000.
Deshay, Harry W.: *See—*
Doolittle, Donald B.; and Deshay, Harry W., 4,042,079, Cl. 188-290.000.
Deshmukh, Arvind D. In a method for checking the accuracy of a test using an enzymatically hydrolyzable, serum-soluble cholesterol compound. 4,042,330, Cl. 23-230.00B.
DeSoto, Inc.: *See—*
Murphy, Edward J., 4,042,566, Cl. 260-47.0EP.
Deutsche Gold- und Silber-Scheideanstalt vormals Roessler: *See—*
Ackermann, Rolf; Morlock, Gerhard; and Stehlik, Gerhard, 4,042,525, Cl. 252-106.000.
Bertram, Heidrun; Fahnenstich, Rudolf; Junkermann, Helmut; Pohl, Gerhard; and Tanner, Herbert, 4,042,716, Cl. 426-335.000.
Hebbel, Gerhard; Krueger, Horst; Haschke, Heinz; and Morlock, Gerhard, 4,042,748, Cl. 428-323.000.
Deutsche Texaco Aktiengesellschaft: *See—*
Pusch, Gunter; Klatt, Heinz Jurgen; and Frohlich, Walter, 4,042,026. Cl. 166-258.000.
Rietsch, Eike, 4,042,910, Cl. 340-15.5TA.
Dewas, Raymond, to Control Drug, Inc. Weaving machine with external weft supply. 4,041,991, Cl. 139-449.000.
Dexter Corporation, The: *See—*
Conway, Bernard W.; and Moran, James, 4,042,453, Cl. 162-108.000.
Dhein, Rolf: *See—*
Kaiser, Bernd-Ulrich; Dhein, Rolf; Rudolph, Hans; and Kuchenmeister, Rolf, 4,042,547, Cl. 260-22.00R.
Diagnostic Data, Inc.: *See—*
Huber, Wolfgang; Saifer, Mark G.; and Williams, Lewis D., 4,042,689, Cl. 424-177.000.
Diaz, Marcellina. Medical implement. 4,041,937, Cl. 128-15.000.
Dick, Heinrich; and Kobinger, Erhard, to Voith Getriebe KG. Multiple-transmission-ratio transmission arrangement with gear-shift overlap action of automatically varied duration. 4,041,809, Cl. 74-866.000.
Dickenson, William D., to Dana Corporation. Disc brake mechanism actuating means. 4,042,073, Cl. 188-72.900.
Dickson, J. Douglas: *See—*
Blauvelt, Lon; Dickson, J. Douglas; and Russell, Robert C., 4,042,126, Cl. 214-8.50A.
Dictaphone Corporation: *See—*
Wilder, Leslie N.; and Ciaraldi, Anthony, 4,041,890, Cl. 116-114.00R.
Dierckx, Jozef Aime: *See—*
Moelants, Felix Jan; Dierckx, Jozef Aime; and Depoorter, Henri, 4,042,397, Cl. 96-84.00R.
Dierckx, Peter Gerard, to AGFA-GEVAERT N.V. Apparatus for incinerating non-halogenated waste liquids. 4,041,882, Cl. 110-7.00B.
Diers, Ivan Verner, to Novo Industri A/S. Method for producing glucose isomerase. 4,042,460, Cl. 195-65.000.
Diesch, Robert E.: *See—*
Caulfield, Patrick J.; Diesch, Robert E.; and Strunc, Gerald R., 4,042,973, Cl. 235-150.300.
Dieterich, Dieter; Markusch, Peter; and Reiff, Helmut, to Bayer Aktiengesellschaft. Inorganic-organic plastic. 4,042,536, Cl. 260-2.5AK.
Dietz, Albert Louis. Process of growing plants within an enclosure. 4,041,641, Cl. 47-17.000.
Diggle, Edmund A., Jr., to Compax Corporation. Method for compacting woven gauze bandages. 4,041,581, Cl. 26-18.600.
Dills, William Leonard, to Du Pont de Nemours, E. I., and Company. Process for preparing a high concentration of titanium dioxide slurry in dimethylacetamide or dimethylformamide. 4,042,557, Cl. 260-32.6NR.
Dimsdale, Michael John: *See—*
Garside, Peter; and Dimsdale, Michael John, 4,042,697, Cl. 424-258.000.
DiPippo, Carmine A., to Scott Paper Company. Pyrolysis of 2-sulfochloride benzoates. 4,042,600, Cl. 260-327.00S.
Dively, Charles R.; and Peterson, Russell K., to Ingersoll-Rand Company. Raise boring head having fluid traversing means. 4,042,047, Cl. 175-340.000.
Dix, C. Hewitt: *See—*
Fort, J. Robert; Westphal, James A.; and Dix, C. Hewitt, 4,042,905, Cl. 340-15.5DP.
Doane, J. Chalmers. Teaching ukelele. 4,041,830, Cl. 84-305.000.
Dobson, LeRoy E.: *See—*
Lin, Kou Chi; and Dobson, LeRoy E., 4,042,775, Cl. 174-94.00R.
Doddema, Harmannus J.: *See—*
Harrison, David E. F.; and Doddema, Harmannus J., 4,042,458, Cl. 195-28.00R.
Dolenc, Anton; Christ, Alfred; and Lehmann, Rolf, to Escher Wyss Limited. Rolling mills having hydraulic forces exerted on the exterior roll surfaces. 4,041,752, Cl. 72-201.000.
Dolida, Roger Joseph: *See—*
Acomb, Byron Hillen; and Dolida, Roger Joseph, 4,041,969, Cl. 137-88.000.
Dombroski, John R.; and Weemes, Doyle A., to Eastman Kodak Company. 2-Cyanoacrylate adhesive composition. 4,042,442, Cl. 156-310.000.
Donabin, Claude Jules; and Mercier, Denis L. J. G., to Compagnie Honeywell Bull. Apparatus for the processing of documents. 4,042,807, Cl. 235-61.11R.
Doolittle, Donald B.; and Deshay, Harry W., to All American Industries, Inc. Variable energy absorber for aircraft arresting system. 4,042,079, Cl. 188-290.000.
Dorey, Jacques A., to Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.). Helicopter navigation system. 4,042,929, Cl. 343-113.0DE.
Dorsch, Hans H., to INA Bearing Company, Inc. Thrust bearing. 4,042,285, Cl. 308-235.000.
Dougan, Ramon C.; and Rudtke, Helen T., to American Hospital Supply Corporation. Surgical drape. 4,041,942, Cl. 128-132.00D.
Doughty, Kenneth W.: *See—*
Hinton, Reginald A.; Doughty, Kenneth W.; and Kennedy, William N., 4,042,900, Cl. 336-70.000.
Dow Chemical Company, The: *See—*
Kallos, George J., 4,042,326, Cl. 23-230.00R.
Nimerick, Kenneth H.; and Simpson, Benny E., 4,042,529, Cl. 252-363.500.
Ramstad, Tore; Mahle, Nels H.; and Matalon, Ralph, 4,042,499, Cl. 210-31.00C.
Strycker, Stanley J., 4,042,692, Cl. 424-244.000.
Strycker, Stanley J., 4,042,709, Cl. 424-304.000.
Strycker, Stanley J., 4,042,712, Cl. 424-329.000.
Watts, Harry, 4,042,541, Cl. 260-2.50B.
Dow Corning Corporation: *See—*
Swihart, Terence J., 4,042,563, Cl. 260-45.90K.
Downs Surgical Limited: *See—*
Hall, John Emmett, 4,041,939, Cl. 128-69.000.
Draftex Development AG: *See—*
Bright, Robert G., 4,042,741, Cl. 428-217.000.
Dragotinov, Alexander, to Siemens Aktiengesellschaft. Apparatus for synchronizing oscillators in the network nodes of a digital telecommunications network. 4,042,781, Cl. 179-15.0BS.
Draisbach, Adolf: *See—*
Fiedler, Kurt H.; and Draisbach, Adolf, 4,042,259, Cl. 280-701.000.
Drake, Cyril Francis; and Amos, Robert Walter James, to International Standard Electric Corporation. Biocidal glass materials. 4,042,402, Cl. 106-15.00R.
Drbal, Vladimir J., to Coulter Electronics, Inc. Diluting apparatus. 4,042,152, Cl. 222-137.000.
Dressel, Edwin J.; and Hunter, Houston W., to J. Ray McDermott & Co., Inc. Sand shield jet sled. 4,041,717, Cl. 61-72.400.
Dresser Industries, Inc.: *See—*
Angehrn, Jorg August, 4,041,780, Cl. 73-151.000.
Conti, Jack, 4,041,761, Cl. 73-420.000.
Drewek, David F.; and Hoffman, Dickie D., to General Motors Corporation. Steerable trailer for a small vehicle. 4,042,255, Cl. 280-445.000.
Driver, K. Dwight. Means for and method of removing a cast. 4,041,941, Cl. 128-91.00A.
Drnevich, Raymond Francis: *See—*
Matsch, Ladislas Charles; and Drnevich, Raymond Francis, 4,042,493, Cl. 210-6.000.
Drori, Mordeki. Self cleanable filters. 4,042,504, Cl. 210-107.000.
Du Pont of Canada: *See—*
Kershaw, Bernard John, 4,042,629, Cl. 260-583.00P.
Dubois, Guy. Slenderizing ladies' roll-on belt of improved comfort. 4,041,957, Cl. 128-540.000.
Duncan, Leroy A.; and Aksamit, Steve M., to Standard Alliance Industries, Inc. Sorting device for magazine or the like. 4,042,113, Cl. 209-74.00R.
Duncan, Patrick Joseph; and Scrivener, Francis Edward, Jr., to Du Pont de Nemours, E. I., and Company. Multilobal polyester yarn. 4,041,689, Cl. 57-140.00J.
Dunn, Byron G. Fire extinguishing composition. 4,042,521, Cl. 252-5.000.
Dunne, Gerald J.; and Harvey, John D., to Delmar Chemicals Limited. Additives for animal feeds. 4,042,722, Cl. 426-648.000.
Dunne, Liam: *See—*
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Du Pont de Nemours, E. I., and Company: *See—*
Balmat, Jean Louis, 4,042,668, Cl. 423-243.000.
Bell, Robert Glenn; Gillyns, Emile; and McDaniel, Olin Kilpatrick, Jr., 4,042,569, Cl. 260-75.00T.
Black, Richard William, 4,041,589, Cl. 29-33.00M.
Brethauer, Dale M., 4,042,108, Cl. 206-392.000.
Chay, Dong Myung, 4,042,731, Cl. 427-311.000.
Cope, Charles S.; and Couture, Maurice J., 4,042,634, Cl. 210-616.000.
Dell, Curtis G.; and Williamson, James A., Jr., 4,042,333, Cl. 23-232.00R.

Dills, William Leonard, 4,042,557, Cl. 260-32.6NR.
Duncan, Patrick Joseph; and Scrivener, Francis Edward, Jr., 4,041,689, Cl. 57-140.00J.
Fanning, Herbert H., 4,042,539, Cl. 260-16.000.
Hart, Marvin Sumner; and Powers, William James, Jr., 4,041,583, Cl. 28-254.000.
Hazan, Isidor; and Iacona, Robert N., 4,042,478, Cl. 204-181.000.
Humkey, Robert Garnett; Marshall, Donald Raymond; and Ryan, Donald James, 4,042,220, Cl. 259-95.000.
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Manzer, Leo Ernest, 4,042,610, Cl. 260-429.300.
McIntosh, Colin Leslie, 4,042,650, Cl. 260-924.000.
Miegel, Ralph E., 4,042,619, Cl. 260-482.00P.
Moje, Steven William, 4,042,373, Cl. 71-91.000.
Ostapchenko, George Joseph; and Phillips, Terrance Duane, 4,042,657, Cl. 264-40.100.
Poskitt, Ralph Leroy, 4,042,554, Cl. 260-29.7NR.
Ripka, William Charles, 4,042,707, Cl. 424-274.000.
Sauer, John Carl, 4,042,621, Cl. 260-561.00R.
Shannon, Robert Day; and Taylor, Barry Edward, 4,042,482, Cl. 204-242.000.
Shearon, Michael Hillas, 4,041,816, Cl. 83-100.000.
Williamson, Thomas Donald, 4,041,584, Cl. 28-269.000.

Durant, Walter F. Torque limiting driver. 4,041,811, Cl. 81-52.40R.

Durling, Hubert R., Jr.: *See*—
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Duve, George, to Area Lighting Research, Inc. Fail-off photo control circuit for night lighting. 4,042,853, Cl. 315-155.000.

Dvorak, Vernon B. Means of measuring a puppy's tail for surgically docking the same. 4,041,611, Cl. 33-174.00D.

Dynamit Nobel Aktiengesellschaft: *See*—
Bruning, Klaus; Junger, Hans; Pungs, Wolfgang; Rheinfeld, Peter; Weissenfels, Franz; and Wienand, Michael, 4,042,314, Cl. 425-89.000.
Lenz, Arnold; and Rogler, Walter, 4,042,636, Cl. 260-632.00A.

Eastlund, Bernard John: *See*—
Ury, Michael Gerson; Eastlund, Bernard John; Braden, Ray S.; and Wooo, Charles H., 4,042,850, Cl. 315-39.000.

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Columbus, Richard L., 4,041,995, Cl. 141-275.000.
Dombroski, John R.; and Weemes, Doyle A., 4,042,442, Cl. 156-310.000.
Esders, Theodore Walter; Schaeffer, James Robert; and Harris, Harry Wayne, 4,042,461, Cl. 195-66.00R.
Gysling, Henry James; and Lelental, Mark, 4,042,392, Cl. 96-48.0PD.
Leszyk, Gerald M.; Morrison, Edward D.; and Williams, Robert F., Jr., 4,042,654, Cl. 264-22.000.
Smith, Wendell F., Jr.; Eddy, Kenneth L.; and Harnish, Donald P., 4,042,394, Cl. 96-56.000.
Sylvester, Robert A., 4,042,396, Cl. 96-76.00C.
Tone, Frederick F.; and Borel, Robert J., 4,042,395, Cl. 96-76.00C.

Eaton Corporation: *See*—
Knapp, Kenneth K., 4,041,703, Cl. 60-464.000.

Ebauches S.A.: *See*—
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ECC Corporation: *See*—
Grubbs, Calvin E.; and Harwell, Jack B., 4,042,871, Cl. 363-28.000.

Eccleston, Kenneth Thomas, to Foseco Trading A.G. Tundish with weirs. 4,042,229, Cl. 266-275.000.

Eckerle, Joseph S. High efficiency electrical power conditioner. 4,042,890, Cl. 330-207.00A.

Eckert, Konrad; and Eheim, Franz, to Robert Bosch GmbH. Fuel injection pump for internal combustion engines. 4,041,921, Cl. 123-140.00R.

Eckl, Robert: *See*—
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Edamura, Koji; Nakagawa, Yoshimasa; and Ikeda, Yoshitaka, to Nihon Yushi Co., Ltd. Process for curing unsaturated resins. 4,042,646, Cl. 260-864.000.

Eddy, Kenneth L.: *See*—
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Edwards, Raymond S. Energy system producing electricity, hot water and steam from combustible refuse. 4,041,906, Cl. 122-2.000.

Edwards, Richard A.: *See*—
Robinson, John Thomas; and Edwards, Richard A., 4,042,951, Cl. 357-67.000.

Effic Trading and Services Ltd.: *See*—
Egosi, Isaac, 4,041,855, Cl. 100-138.000.

Egosi, Isaac, to Effic Trading and Services Ltd. Opposed box baling press. 4,041,855, Cl. 100-138.000.

Eheim, Franz: *See*—
Eckert, Konrad; and Eheim, Franz, 4,041,921, Cl. 123-140.00R.

Ehrlich, Stephen Jeffrey, to Becton, Dickinson and Company. Sensitivity disc dispenser with tamper mechanism. 4,042,145, Cl. 221-94.000.

Eibeck, Richard E.: *See*—
Nychka, Henry R.; Eibeck, Richard E.; and Li, Chien C., 4,042,524, Cl. 252-69.000.

Eickelberg, John E.; and Rice, James S., to Industrial Nucleonics Corporation. Backlash compensation. 4,042,869, Cl. 318-630.000.

Eilingsfeld, Heinz; and Lach, Dietrich, to BASF Aktiengesellschaft. Isolation of dinitroanthraquinone having a high content of α,α-dinitro compounds. 4,042,604, Cl. 260-369.000.

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Griss, Gerhart; Grell, Wolfgang; Hurnaus, Rudolf; Sauter, Robert; Eisele, Bernhard; Kaubisch, Nikolaus; and Leitold, Matyas, 4,042,711, Cl. 424-319.000.

Eisen -und Drahtwerk Erlau Aktiengesellschaft: *See*—
Muller, Anton, 4,042,001, Cl. 152-243.000.

Eisendick, Horst: *See*—
Meyer, Hans; Kaseberg, Werner; Eisendick, Horst; and Lucke, Willi, 4,042,902, Cl. 338-128.000.

Eisenstein, Reuben: *See*—
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Eitzen, Vincent E.: *See*—
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Ekman, Bjorn; and Tyrefors, Lars, to AB Svenska Dental Instrument. Sterile package. 4,042,170, Cl. 229-62.500.

Elder, Jerome Earl, to International Paper Company. Reinforced paperboard box. 4,042,165, Cl. 229-33.000.

Elder Laboratories: *See*—
MacArthur, J. Roderick, 4,041,575, Cl. 24-73.0HH.

Electric Power Research Institute: *See*—
Perry, Elijah R.; and Rabinowitz, Mario, 4,042,012, Cl. 165-1.000.

Electronic Arrays, Inc.: *See*—
Sikes, Wayne Alan, 4,042,843, Cl. 307-297.000.

Eli Lilly and Company: *See*—
Guernsey, Richard H., 4,042,110, Cl. 206-459.000.
Hall, David A., 4,042,472, Cl. 204-73.00R.
Harper, Richard W., 4,042,372, Cl. 71-90.000.
Koppel, Gary A., 4,042,585, Cl. 544-22.000.
O'Doherty, George O. P., 4,042,593, Cl. 260-294.80C.
Tensmeyer, Lowell G., 4,042,325, Cl. 21-54.00R.

Elitex: *See*—
Brada, Pavel; Kucera, Jaromir; Chladek, Otokar; Voda, Gustav; Novacek, Jindrich; and Kollmann, Jan, 4,041,733, Cl. 66-138.000.

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Resch, Josef; Kadlec, Miloslav; Zahradnik, Stanislav; and Parizek, Josef, 4,041,986, Cl. 139-58.000.

Elkin, Robert D., to Collins Machinery Corporation. Pipe grooving apparatus. 4,041,747, Cl. 72-105.000.

Elliott Brothers (London) Limited: *See*—
Ellis, Stafford Malcolm, 4,042,957, Cl. 358-109.000.

Elliott, Donald P.; and Halseth, William L. Radiopaque anastomosis marker. 4,041,931, Cl. 128-1.00R.

Ellis, John; and Dunne, Liam. Apparatus for presenting reading matter as a linear book. 4,041,626, Cl. 40-86.00R.

Ellis, Stafford Malcolm, to Elliott Brothers (London) Limited. Display systems. 4,042,957, Cl. 358-109.000.

ELMEG Elektro-Mechanik GmbH: *See*—
Reuting, Hans Werner, 4,042,799, Cl. 200-288.000.

Elmquist, Bernt Holger: *See*—
Johansson, Erik Gunnar; Blomberg, Bengt Ture Hubertus; and Elmquist, Bernt Holger, 4,041,962, Cl. 132-91.000.

Eluard, Robert: *See*—
Baudouin, Yvonne; Simonet, Guy; Eluard, Robert; and Pivard, Claude, 4,042,349, Cl. 55-25.000.

Emal, Earl A.; and Lambert, Jack L. Joint tape for dry wall construction having water-initiated adhesive which once activated, attached to, and dried on a surface resists removal under remoistening conditions. 4,042,739, Cl. 428-137.000.

Emerson, Robert T.: *See*—
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Emery Industries, Inc.: *See*—
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Endo, Ichiro: *See*—
Inoue, Eiichi; Endo, Ichiro; and Yamanouchi, Teruo, 4,042,388, Cl. 96-1.600.

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Wada, Hajime; Kikuchi, Shouji; Hori, Haruo; and Endo, Takaya, 4,042,393, Cl. 96-55.000.

Energetics Science, Inc.: *See*—
Blurton, Keith F.; and Sedlak, John M., 4,042,464, Cl. 204-1.00T.

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Bjerk, Roger O.; Brandon, William D.; Engleking, Frederick S.; and Jero, John P., 4,042,085, Cl. 192-57.000.

English, David C.: *See*—
Reichow, Keith W.; English, David C.; and McCauley, Jerry L., 4,042,049, Cl. 177-137.000.

Englund, Arnold: *See*—
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Ennes, John W.; and Ennes, John P., 4,042,028, Cl. 160-263.000.

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Environmental Elements Corporation: *See*—
Tully, William Howard, 4,042,354, Cl. 55-129.000.

Epic Chemical Inc.: *See*—
Argiriardi, Andrew A., 4,042,368, Cl. 71-67.000.

Eppendorf Geraetebau Netheler & Hinz GmbH: *See*—
Sabloewski, Horst; Schurbrock, Klaus; and Solter, Dieter, 4,041,764, Cl. 73-425.600.
Eremin, Vladimir Fedorovich: *See*—
Itin, Artur Markovich; and Eremin, Vladimir Fedorovich, 4,042,087, Cl. 192-99.00S.
Ernst, Horst M.; Brandenstein, Manfred; and Olschewski, Armin, to SKF Industrial Trading and Development Company B.V. Apparatus for connecting a clutch release bearing to a clutch release actuating element. 4,042,086, Cl. 192-98.000.
Ernst Winter & Sohn: *See*—
Sawluk, Wlodzimierz, 4,041,650, Cl. 51-206.00R.
Ervin, Dan: *See*—
Guillet, James Edwin; and Ervin, Dan, 4,042,568, Cl. 260-65.000.
Escher Wyss Limited: *See*—
Dolenc, Anton; Christ, Alfred; and Lehmann, Rolf, 4,041,752, Cl. 72-201.000.
Esders, Theodore Walter; Schaeffer, James Robert; and Harris, Harry Wayne, to Eastman Kodak Company. Method for purifying cholesterol esterase. 4,042,461, Cl. 195-66.00R.
Eskridge, Brewster B.: *See*—
Corbin, Thomas F., Jr.; Eskridge, Brewster B.; and Lyon, Boyce M., 4,042,662, Cl. 264-210.00F.
ESL Incorporated: *See*—
Altes, Richard A., 4,042,928, Cl. 343-5.0SA.
Eslick, Robert Freeman: *See*—
Goering, Kenneth Justin; and Eslick, Robert Freeman, 4,042,414, Cl. 127-32.000.
Espy, Donald M.; and Henry, James L., to Bendix Corporation, The. Reorientation device for an object manipulator. 4,042,122, Cl. 214-1.0CM.
Etablissements Francois Salomon et Fils: *See*—
Salomon, Georges Pierre Joseph, 4,042,257, Cl. 280-624.000.
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Kalopissis, Gregoire; Bugaut, Andree; and Estradier, Francoise, 4,042,627, Cl. 260-571.000.
Etat Francais: *See*—
Thevenin, Michel J.; Brun, Michel; Boileau, Jacques; and Pegoud, Joseph, 4,041,866, Cl. 102-24.0HC.
Ettel, Godwin, to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG. Circuit arrangement for supplying clock pulses to a projectile fuze. 4,041,870, Cl. 102-70.2GA.
Eustache, Jean-Marie, to Union Cooperative Agricole Laitiere de la Manche. Extraction of glycoproteins and sialic acid from whey. 4,042,575, Cl. 260-112.00R.
Eustache, Jean-Marie, to Union Cooperative Agricole Laitiere de la Manche. Extraction of glycoproteins and sialic acid from whey. 4,042,576, Cl. 260-112.00R.
Evanicky, Daniel E.: *See*—
Ristagno, Charles V., to Micro-Display Systems, Inc. Illuminated electro-optical display apparatus. 4,042,294, Cl. 350-60LC.
Evans, Norol T.; and Wunderlich, Francis J., to Hughes Aircraft Company. MTI clutter tracking and cancelling system. 4,042,924, Cl. 343-7.00A.
Evans, Seth F.; and Hall, Jairus Donn, to Evans, Seth F. Method and apparatus for detonating explosives. 4,041,865, Cl. 102-20.000.
Everest & Jennings, Inc.: *See*—
Rodaway, Keith S., 4,042,250, Cl. 280-42.000.
Everhart, Louise A.: *See*—
Lile, Barbara A.; Lane, Robert M.; and Everhart, Louise A., 4,042,232, Cl. 269-328.000.
Exclusive Envelope Corporation: *See*—
Ross, Martin I.; and Rogers, Arthur M., 4,042,171, Cl. 229-72.000.
Exxon Production Research Company: *See*—
Holland, Warren E.; and True, Martin E., 4,042,033, Cl. 166-310.000.
Exxon Research and Engineering Co.: *See*—
Brois, Stanley J., 4,042,523, Cl. 252-32.7HC.
Floyd, Joseph C.; and Plank, Don A., 4,042,765, Cl. 526-6.000.
Vannice, M. Albert; and Garten, Robert L., 4,042,614, Cl. 260-449.00R.
Vannice, M. Albert; and Garten, Robert L., 4,042,615, Cl. 260-449.60R.
Ezell, George D., to Texas Instruments Incorporated. Automatic data acquisition method and system. 4,042,906, Cl. 340-15.5TS.
Fa. Bowe, Bohler & Weber KG Maschinenfabrik: *See*—
Wanner, Rudolf; and Eckl, Robert, 4,042,235, Cl. 271-94.000.
Fahnenstich, Rudolf: *See*—
Bertram, Heidrun; Fahnenstich, Rudolf; Junkermann, Helmut; Pohl, Gerhard; and Tanner, Herbert, 4,042,716, Cl. 426-335.000.
Fahrig, Robert J.; and Timm, Terry W., to Standard Oil Company. Method for reducing catalyst particle emissions in fluidized catalytic cracking processing. 4,042,489, Cl. 208-152.000.
Fairbanks, Philip R., to Idaho Concrete Pipe Co., Inc., a part interest. Mobile loading apparatus for large articles. 4,042,136, Cl. 214-146.500.
Falconbridge Nickel Mines Limited: *See*—
Hatch, William Ronald, 4,042,665, Cl. 423-139.000.
Falk, Robert A., to Ciba-Geigy Corporation. Aqueous wetting and film forming compositions. 4,042,522, Cl. 252-8.050.
Falkinger, Willard; and Asberg, Per Anders, to Defibrator AB. Method and apparatus for stacking and feeding blanks to a tiered multi-opening press for the production of pressed board. 4,042,125, Cl. 214-6.0BA.
Falterman, Charles W.; Griffith, William J.; and Gryting, Harold J., to United States of America, Navy. Temperature resistant explosive containing diaminotrinitrobenzene. 4,042,430, Cl. 149-19.300.
Famolare, Inc.: *See*—
Famolare, Joseph P., Jr., 4,041,618, Cl. 36-25.00R.
Famolare, Joseph P., Jr., to Famolare, Inc. Contoured sole for high heeled shoes. 4,041,618, Cl. 36-25.00R. .
Fanning, Herbert H., to Du Pont de Nemours, E. I., and Company. Primer-surfacer composition of an acrylic polymer, a polyester resin and an organic dispersant. 4,042,539, Cl. 260-16.000.
Farmhand, Inc.: *See*—
McFarland, Douglas F., 4,042,140, Cl. 214-518.000.
Fasttest Company: *See*—
Peterson, Roger W.; and Kordes, Arthur W., 4,042,878, Cl. 324-51.000.
Fastway Fasteners, Inc.: *See*—
Schuplin, Jerome T., 4,041,657, Cl. 52-39.000.
Feldmann, William F. Adjustable leverage pry bar. 4,042,210, Cl. 254-26.00R.
Feldstein, Nathan, to RCA Corporation. Temperature-stable non-magnetic alloy. 4,042,382, Cl. 75-170.000.
Feneberg, Paul, to AGFA-Gevaert, A.G. Method for the production of silicone elastomer-containing articles. 4,042,652, Cl. 264-1.000.
Fenneman, David B., to United States of America, Navy. Hypersonic gas laser. 4,042,892, Cl. 331-94.50G.
Ferdelman, Donald C.: *See*—
Weibel, John, Jr.; and Ferdelman, Donald C., 4,041,723, Cl. 62-126.000.
Fermanich, Raymond J.: *See*—
Boyer, George C.; and Fermanich, Raymond J., 4,042,173, Cl. 236-49.000.
Ferrante, Gerald R.: *See*—
Baum, Elliot H.; and Ferrante, Gerald R., 4,042,319, Cl. 8-35.000.
Ferranti Limited: *See*—
Brown, Kenneth Robson; and Sharp, Colin Keith, 4,042,815, Cl. 235-194.000.
Ferrar, Andrew Nicholas, to British Cellophane Limited. Cohesive coating compositions. 4,042,732, Cl. 427-385.00R.
Ferrier, Duncan Cameron: *See*—
Foster, Peter William; Ferrier, Duncan Cameron; Berry, Thomas; and Murenbeeld, Karel, 4,041,586, Cl. 28-254.000.
Fersch, Kenneth Eugene; and Stearns, Wayne Eugene, to O.M. Scott & Sons Company, The. Controlled release fertilizer. 4,042,366, Cl. 71-29.000.
Fey, Maurice G.; and Wolf, Charles B., to Westinghouse Electric Corporation. Three-phase arc heater. 4,042,802, Cl. 219-121.00P.
Fiat-Allis Construction Machinery, Inc.: *See*—
Bertolino, Giorgio M., 4,042,116, Cl. 212-140.000.
Crum, Robert L., 4,042,065, Cl. 184-1.00E.
Koch, George Paul, 4,042,052, Cl. 180-6.700.
Fickelscher, Kurt Gerhard, to Balke-Durr AG. Planetary gearing. 4,041,808, Cl. 74-800.000.
Fiedler, Kurt H.; and Draisbach, Adolf, to General Motors Corporation. Suspension strut assemblies for motor vehicle suspensions. 4,042,259, Cl. 280-701.000.
Fields, Ellis K., to Standard Oil Company (Indiana). Oxidation catalyst and process. 4,042,531, Cl. 252-438.000.
Fieldsend, Terence: *See*—
Jackson, George; and Fieldsend, Terence, 4,042,384, Cl. 75-214.000.
Finegan, John J., Jr., to Hunt Electronics Company. Power control slide switch. 4,042,903, Cl. 338-159.000.
Fischel, Halbert: *See*—
Anderson, Robert L., 4,042,351, Cl. 55-52.000.
Fischer, Adolf: *See*—
Kiehs, Karl; Koenig, Karl-Heinz; and Fischer, Adolf, 4,042,628, Cl. 260-577.000.
Fischer & Porter Co.: *See*—
Davis, James W.; and Hilton, Garrett H., 4,041,981, Cl. 137-604.000.
Head, Victor P.; and Herzl, Peter J., 4,041,756, Cl. 73-194.00E.
Fischer, Rolf: *See*—
Weitz, Hans-Martin; Fischer, Rolf; and Lenke, Dieter, 4,042,587, Cl. 544-183.000.
Weitz, Hans-Martin; Fischer, Rolf; and Lenke, Dieter, 4,042,588, Cl. 544-183.000.
Fisher Controls Company: *See*—
Rice, Donald D.; and Walton, Herbert H., 4,041,973, Cl. 137-315.000.
Fisher, George A.; and Richardson, Warner G., to Caterpillar Tractor Co. Guide rail assembly for the ejector of a scraper and method. 4,041,625, Cl. 37-126.0AE.
Fisher, Milton W.: *See*—
Henson, Glen E.; and Fisher, Milton W., 4,041,760, Cl. 73-379.000.
Fisher, Robert C. Seat belt system. 4,042,277, Cl. 297-388.000.
Fisons Limited: *See*—
Lee, Thomas Brian; Hardern, David Norman; and Bantick, John Raymond, 4,042,708, Cl. 424-283.000.
Flam, Eric; and Partyka, Doris Phyliss, to Johnson & Johnson. Digital tampon. 4,041,948, Cl. 128-285.000.
Flannelly, William George, to Kaman Aerospace Corporation. Remote resonator apparatus and method. 4,042,070, Cl. 188-1.00B.
Flint, Theodore R. Insulating glass units. 4,042,736, Cl. 428-34.000.
Flintkote Company, The: *See*—
Stepien, George, Jr.; Califano, Frank L., deceased; DeLorenzo, William, Jr., co-executor; Gillard, G. Bruce, co-executor; Russell, Thomas E., deceased; and Russell, Florence P., executrix, 4,041,712, Cl. 61-36.00R.
Floyd, Joseph C.; and Plank, Don A., to Exxon Research and Engineering Co. Photodegradable plastic compositions containing nitrogen heterocyclic compounds. 4,042,765, Cl. 526-6.000.

Flynn Burner Corporation: *See—*
Flynn, Edward S., 4,042,317, Cl. 432-124.000.
Flynn, Edward S., to Flynn Burner Corporation. Direct flame apparatus for drying can coatings. 4,042,317, Cl. 432-124.000.
FMC Corporation: *See—*
McCarthy, Richard H., 4,042,077, Cl. 188-171.000.
Roberts, Thomas E., Jr., 4,041,781, Cl. 73-483.000.
Youmans, Donald W., 4,042,260, Cl. 280-721.000.
Fokker-VFW B.V.: *See—*
Bijlmer, Paul Frederik A., 4,042,475, Cl. 204-141.500.
Folker, John F. Trolling accessory for fishing. 4,041,636, Cl. 43-42.310.
Folmar, Robert G.; and Weetman, Ronald J., to Corning Glass Works. Method of manufacturing a die for extruding honeycomb articles. 4,041,597, Cl. 29-423.000.
Forbes Jones, Robin Mackay: *See—*
Petersen, Walter Adrian; and Forbes Jones, Robin Mackay, 4,042,383, Cl. 75-171.000.
Ford Motor Company: *See—*
Peng, Stephen Chung-Suen, 4,042,560, Cl. 260-42.280.
Ford, Norman F. Paint brush bristle shaping device. 4,041,566, Cl. 15-257.00R.
Forkner, John H. Cactus treatment process and product. 4,042,720, Cl. 426-573.000.
Forsell, Bror Ingvar, to RP Rorprodukter AB. Connection between water tubes. 4,042,021, Cl. 166-85.000.
Forsgren, Klane F.; Melamed, Sidney; and Weiner, Robert S., to Rohm and Haas Company. Process for producing crimped metal-coated filamentary materials, and yarns and fabrics obtained therefrom. 4,042,737, Cl. 428-96.000.
Fort, J. Robert; Westphal, James A.; and Dix, C. Hewitt, to Geophysical Systems Corporation. Data acquisition, transport and storage system. 4,042,905, Cl. 340-15.5DP.
Foseco Trading A.G.: *See—*
Eccleston, Kenneth Thomas, 4,042,229, Cl. 266-275.000.
Foster, Peter William; Ferrier, Duncan Cameron; Berry, Thomas; and Murenbeeld, Karel, to John Heathcoat & Company Limited. Textile fluid b lking process. 4,041,586, Cl. 28-254.000.
Fostick, Moshe A. Method for monitoring blood gas tension and pH from outside the body. 4,041,932, Cl. 128-2.00G.
Fox, Anthony. Baling machine with improved platen drive and guide assembly. 4,041,856, Cl. 100-214.000.
Fox, Roy A.: *See—*
Raimondi, Victor V.; Fox, Roy A.; and Piorkowski, Casey E., 4,042,555, Cl. 260-29.6RB.
Fox, Roy Kelvin Noel, to Weatherford Oil Tool Co., Inc. Control line protector. 4,042,023, Cl. 166-241.000.
Frank, James P.: *See—*
Woods, Lee O.; and Frank, James P., 4,042,860, Cl. 361-25.00C.
Frank, Pierre: *See—*
Arsac, Aime Joseph; and Frank, Pierre, 4,042,579, Cl. 260-178.000.
Frank, Robert I.: *See—*
Kaplow, Roy; and Frank, Robert I., 4,042,417, Cl. 136-89.0PC.
Franke, Johannes; Kessler, Kurt; Muller, Wolfgang; Sauerbier, Heinz; Schneider, Kurt; and Unbehaun, Karl, to VVB Haushalts- und Verpackungsglas. Apparatus for the continuous melting of salts used for modifying the properties of articles of glass or similar materials. 4,042,318, Cl. 432-210.000.
Frankel, S. Arthur; and Cueman, Glenn F. Contoured knee immobilizer. 4,041,940, Cl. 128-80.00C.
Franklin, Benjamin S.: *See—*
Bachman, Charles W.; and Franklin, Benjamin S., 4,042,912, Cl. 364-200.000.
Franklin, Robert C. Power control for variable speed induction motors. 4,042,862, Cl. 318-231.000.
Frazier, Calvin H. Artificial patella and method of repairing a natural patella. 4,041,550, Cl. 3-1.910.
Freedman, Mark, to Westinghouse Electric Corporation. Modular roadway for a transportation system. 4,042,308, Cl. 404-1.000.
Fregeolle, Oscar, to Pilot Research Corporation. Lower body garment and method of making same. 4,041,736, Cl. 66-177.000.
Freimanis, Laimons, to Bell Telephone Laboratories, Incorporated. Telephone ringer circuit. 4,042,786, Cl. 179-84.00R.
Freisleben, Reinhard, to Soding TV GmbH & Co. Bild & Ton International. Film strip projection equipment. 4,042,297, Cl. 353-109.000.
Friant, James E.; and Klopich, Marshall E., to Rocket Research Corporation. Two component field mix hydrazine base explosive. 4,042,431, Cl. 149-36.000.
Fried. Krupp Gesellschaft mit beschrankter Haftung: *See—*
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Fried. Krupp Huttenwerke AG: *See—*
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Friedrich Deckel Aktiengesellschaft: *See—*
Kuhnert, Hans, 4,041,588, Cl. 29-26.00R.
Friel, Ronald Norman: *See—*
Hanak, Joseph John; Friel, Ronald Norman; and Goodman, Lawrence Alan, 4,042,293, Cl. 350-160.0LC.
Frielingsdorf, Hans: *See—*
Bachl, Robert; Frielingsdorf, Hans; Gruber, Wolfgang; Mueller-Tamm, Heinz; and Gonsior, Leonhard, 4,042,770, Cl. 526-106.000.
Frigo, Vito, to Ausatuft S.p.A. Machine for stripping from frames, particularly pin frames, materials restrained to said frames. 4,042,120, Cl. 214-1.0BB.
Frohlich, Walter: *See—*
Pusch, Gunter; Klatt, Heinz Jurgen; and Frohlich, Walter, 4,042,026, Cl. 166-258.000.
Frohmader, Stanley H., to Research Products Corporation. Filter media. 4,042,358, Cl. 55-497.000.
Frontier Machinery Company: *See—*
Ames, Kenneth R., 4,041,975, Cl. 137-344.000.
Frost Engineering Development Corporation: *See—*
Frost, Richard H.; and Criley, Ronald L., 4,042,194, Cl. 244-151.00A.
Frost, Richard H.; and Criley, Ronald L., to Frost Engineering Development Corporation. Parachute harness release mechanism. 4,042,194, Cl. 244-151.00A.
Frump, John Adams; and Hunsucker, Jerry Hoyt, to IMC Chemical Group, Inc. Thermogenic system. 4,042,520, Cl. 252-70.000.
Fryrear, Max Dennis, to Caterpillar Tractor Co. Integral rippers for hydraulic excavator bucket. 4,041,624, Cl. 37-117.500.
Fuchino, Yoshihide: *See—*
Yamaguchi, Yoshihiro; Shimohata, Takashi; Kaneda, Tsugio; Kita, Sodai; Fuchino, Yoshihide; Kawauchi, Masashi; Furusawa, Sadayashi; and Iwata, Shuzi, 4,042,380, Cl. 75-124.000.
Fuji Shoten Co. Ltd.: *See—*
Ikinobu, Hiroaki, 4,041,778, Cl. 73-119.00A.
Fuji Xerox Co., Ltd.: *See—*
Yoshikawa, Akira, 4,042,936, Cl. 346-1.000.
Fujii, Hitoshi: *See—*
Takamizawa, Minoru; Yamamoto, Yasushi; Inoue, Yoshio; Noshiro, Atsumi; and Fujii, Hitoshi, 4,042,613, Cl. 260-448.20B.
Fujii, Masakatsu; and Yasufuku, Toshio, to Kabushikikaisha Hara Shokki Seisakusho. Textile sliver can changing and storage apparatus. 4,042,093, Cl. 198-339.000.
Fujitsu Fanuc Limited: *See—*
Hashimoto, Yoshihiro; and Isobe, Shinichi, 4,042,812, Cl. 235-151.110.
Fujitsu Ltd.: *See—*
Yamazaki, Jun'ichiro; Kamo, Takeshi; and Saito, Yoshiichi, 4,042,479, Cl. 204-192.00F.
Fujiwara, Yasutaka: *See—*
Nikaido, Teruji; Haga, Kaoru; and Fujiwara, Yasutaka, 4,042,969, Cl. 361-107.000.
Fukai, Kiyoshi: *See—*
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Fukino, Kunihiro, to Nippon Kogaku K.K. Stopping device for bellows and close photography ring. 4,042,943, Cl. 354-272.000.
Fukumoto, Toru: *See—*
Kawakami, Hirotake; Takada, Kantaro; and Fukumoto, Toru, 4,042,438, Cl. 156-272.000.
Fukutani, Hideo; Oba, Hiroshi; Okada, Akane; and Shimizu, Atsuko, to Mitsubishi Chemical Industries Ltd. Process for forming vesicular photographic images by employing simultaneous actinic light and infra-red reflex exposure. 4,042,391, Cl. 96-47.000.
Fulton, James T., to Grumman Aerospace Corporation. Charge coupled device. 4,042,835, Cl. 307-221.00D.
Funk, Eldon E. Game call with peg guided at fixed angle to striking plate. 4,041,639, Cl. 46-189.000.
Furlette, James L.; and Stadler, Donald. Conveyor. 4,042,104, Cl. 198-774.000.
Furukawa Electric Company, Ltd., The: *See—*
Matsuba, Hironori; and Satou, Kazumi, 4,042,776, Cl. 174-110.00R.
Furusawa, Sadayashi: *See—*
Yamaguchi, Yoshihiro; Shimohata, Takashi; Kaneda, Tsugio; Kita, Sodai; Fuchino, Yoshihide; Kawauchi, Masashi; Furusawa, Sadayashi; and Iwata, Shuzi, 4,042,380, Cl. 75-124.000.
Fusion Systems Corporation: *See—*
Ury, Michael Gerson; Eastlund, Bernard John; Braden, Ray S.; and Wood, Charles H., 4,042,850, Cl. 315-39.000.
Gabel, Floyd S. Sausage slicing machine. 4,041,822, Cl. 83-409.200.
Gadekar, Shreekrishna M., to Affiliated Medical Research, Inc. Method for reducing serum glucose levels. 4,042,699, Cl. 424-263.000.
GAF Corporation: *See—*
Davis, Duane A.; and Krenick, Michael P., 4,041,815, Cl. 83-30.000.
Gaffar, Abdul, to Colgate-Palmolive Company. Antibacterial oral composition. 4,042,679, Cl. 424-54.000.
Gajajiva, Padej: *See—*
Mooney, Thomas C.; and Gajajiva, Padej, 4,042,262, Cl. 285-98.000.
Galins, Peteris Adams: *See—*
Boyle, James Alfred; Galins, Peteris Adams; Gregoire, Mark Charles; and O'Toole, Peter L. M., 4,042,197, Cl. 244-183.000.
Galt Equipment Limited: *See—*
Garside, David, 4,041,725, Cl. 62-223.000.
Galter, Hellmut, to Lindemann Maschinenfabrik GmbH. Scrap shearing machine. 4,041,821, Cl. 83-382.000.
Gammon, Michael William: *See—*
Harris, Colin Frank; and Gammon, Michael William, 4,042,379, Cl. 75-88.000.
Ganias, Fotios. Artificial lens. 4,041,552, Cl. 3-13.000.
Gans, Arnold M.; Goren, Alvin J.; and Gorenberg, Eli M., to Control Drug, Inc. Method of treating obesity by the oral administration of a predigested protein composition. 4,042,687, Cl. 424-177.000.
Gans, Arnold M.; Goren, Alvin J.; and Gorenberg, Eli M., to Control Drug, Inc. Method of providing high-protein nutrition by the oral administration of a predigested protein composition. 4,042,688, Cl. 424-177.000.
Garbe, Dietmar Rudolf, to Vitalograph (Ireland) Limited. Device for breathing measurement. 4,041,935, Cl. 128-2.080.
Garbini, Louis K., to Kubatec Kunststoff- & Bautechnik AG. Method of breaking up objects. 4,042,280, Cl. 299-13.000.

Garcia, Emilio C. Apparatus for and method of stabilizing a marine vessel in pitch. 4,041,885, Cl. 114-126.000.
Gardner, Willis Howard: *See—*
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Garrett Corporation, The: *See—*
Harper, John Everett; and Kell, Louis H., 4,041,695, Cl. 60-39.020.
Schelp, Helmut R., 4,041,699, Cl. 60-39.550.
Garrone, Franco, to AMF Incorporated. Braid forming method and apparatus. 4,041,959, Cl. 131-84.00B.
Garside, David, to Galt Equipment Limited. Control system for refrigeration unit. 4,041,725, Cl. 62-223.000.
Garside, Peter; and Dimsdale, Michael John, to Allen & Hanburys Limited. Isoquinolium compounds for treating diabetes. 4,042,697, Cl. 424-258.000.
Garten, Robert L.: *See—*
Vannice, M. Albert; and Garten, Robert L., 4,042,614, Cl. 260-449.00R.
Vannice, M. Albert; and Garten, Robert L., 4,042,615, Cl. 260-449.60R.
Garun, Yaroslav Evstavievich: *See—*
Kazakova, Ljudmila Petrovna; Gundyrev, Alexei Alexandrovich; Rudakova, Nina Yakovlevna; Sharf, Fridrikh-Leopold Khaskelevich; Garun, Yaroslav Evstavievich; Belyashina, Lidia Ivanovna; and Kocheva, Zoya Vasilievna, 4,042,411, Cl. 106-270.000.
Gaskill, Gerald E.; and Woodlee, James E., to Goodyear Tire & Rubber Company, The. Tire bead retainer. 4,042,003, Cl. 152-381.200.
Gates, Walter C., Jr.: *See—*
Suggitt, Robert M.; and Gates, Walter C., Jr., 4,042,490, Cl. 208-264.000.
Gattermeir, J. David: *See—*
Bacon, Duane E.; Gattermeir, J. David; Hecox, Spencer S.; and Robb, John J., 4,042,467, Cl. 204-15.000.
Gaurois, Raphael Emile, to Hamon Sobelco S.A. Supporting framework for heat transfer surfaces for cooling tower. 4,042,651, Cl. 261-111.000.
Gavrilenko, Jury Alexandrovich: *See—*
Mischenko, Vladimir Petrovich; Oxenenko, Anatoly Yakovlevich; Mischenko, Vladimir Alexandrovich; Vasiliev, Georgy Konstantinovich; Gavrilenko, Jury Alexandrovich; Povelitsa, Vladimir Vasilievich; and Kosenko, Ivan Vasilievich, 4,041,843, Cl. 91-499.000.
Gawin, Adolph J.; and Porazinski, Robert F., to Bell & Howell Company. Photographic recording machine with image designator mark optical system and adjusting means therefor. 4,042,299, Cl. 355-40.000.
Gay, Cecil Arthur Joseph; and Rockey, Leslie George Henry, to British Aircraft Corporation Limited. Electron beam apparatus. 4,042,801, Cl. 219-121.0EB.
Gayte, Michel. Freezing rice. 4,042,717, Cl. 426-508.000.
Geer, Ernest C.: *See—*
Cook, Harold L., Jr.; and Geer, Ernest C., 4,042,034, Cl. 166-314.000.
Geist, Joseph C.: *See—*
Hoback, Ronald D.; and Geist, Joseph C., 4,042,443, Cl. 156-349.000.
General Atomic Company: *See—*
Thomas, Harold A., 4,042,826, Cl. 250-336.000.
General Dynamics: *See—*
Snyder, H. Ben, 4,042,444, Cl. 156-345.000.
General Electric Company: *See—*
Bennett, James Gordy, Jr.; and Cooper, Glenn Dale, 4,042,564, Cl. 260-47.0ET.
Blevins, Theodore J., 4,041,571, Cl. 16-128.00R.
Chang, Mike F., 4,042,448, Cl. 156-650.000.
Henderson, David C.; and Maloney, Kenneth M., 4,042,727, Cl. 427-107.000.
Hinton, Reginald A.; Doughty, Kenneth W.; and Kennedy, William N., 4,042,900, Cl. 336-70.000.
May, John E., 4,042,535, Cl. 252-518.000.
Nakata, Roy; and Johenning, William Joseph, 4,042,774, Cl. 174-14.00R.
Powell, David B.; Castonguay, Roger N.; and Aitken, Donald F., 4,042,896, Cl. 335-17.000.
Smeggil, John G., 4,042,341, Cl. 428-678.000.
Steigerwald, Robert L., 4,042,856, Cl. 315-246.000.
Strong, Herbert M., 4,042,673, Cl. 423-446.000.
Woods, Lee O.; and Frank, James P., 4,042,860, Cl. 361-25.00C.
General Electric Company Limited, The: *See—*
Pakenham, William Edward; and Davis, Leonard Mayor, 4,042,792, Cl. 179-90.00R.
General Motors Corporation: *See—*
Cislo, Casimer J., 4,042,258, Cl. 280-664.000.
Drewek, David F.; and Hoffman, Dickie D., 4,042,255, Cl. 280-445.000.
Fiedler, Kurt H.; and Draisbach, Adolf, 4,042,259, Cl. 280-701.000.
Greb, William H., 4,041,779, Cl. 73-144.000.
Harmon, Kenneth B.; and McQuinn, Ted M., 4,041,810, Cl. 74-868.000.
Meginnis, George B.; and Sodeberg, Earl W., 4,042,162, Cl. 228-106.000.
Morel, Thomas, 4,041,984, Cl. 137-842.000.
Morrison, Donald E., 4,041,696, Cl. 60-39.140.
Nelson, Richard P., 4,042,080, Cl. 188-361.000.
Thune, Robert H., 4,041,603, Cl. 29-623.100.
Weibel, John, Jr.; and Ferdelman, Donald C., 4,041,723, Cl. 62-126.000.
Williamitis, Victor A., 4,042,248, Cl. 277-138.000.
Genese, Joseph Nicholas, to Abbott Laboratories. Arterial blood sampling unit. 4,041,934, Cl. 128-2.00F.
Gentaz, Claude: *See—*
Bienvenu, Gerard; and Gentaz, Claude, 4,042,377, Cl. 75-53.000.
Gentry, David R.: *See—*
Platt, Louis; Wishman, Marvin; Gentry, David R.; and Williams, Jake E., 4,042,655, Cl. 264-25.000.
Geophysical Systems Corporation: *See—*
Fort, J. Robert; Westphal, James A.; and Dix, C. Hewitt, 4,042,905, Cl. 340-15.5DP.
Georges, Andre H.: *See—*
Delarge, Jacques E.; Lapiere, Charles L.; and Georges, Andre H., 4,042,693, Cl. 424-246.000.
Gepesz, Robert: *See—*
Zimmermann nee Ignacz, Zsuzsanna; and Gepesz, Robert, 4,042,719, Cl. 426-573.000.
Gerben, Ralph D., to Solo Cup Company. Cup filling and capping apparatus. 4,042,148, Cl. 221-222.000.
Germanowski, Frank; and Kazura, John A., to United States of America, Army. Analog and digital data recorder. 4,042,938, Cl. 346-61.000.
Gernon, Clarke J., Sr. Apparatus for rotating and indexing miniature train turntables. 4,041,874, Cl. 104-38.000.
Gerth, Vernon W., Jr.: *See—*
Brunnett, Carl J.; and Gerth, Vernon W., Jr., 4,042,811, Cl. 235-151.300.
Gerzon, Michael Anthony: *See—*
Craven, Peter Graham; and Gerzon, Michael Anthony, 4,042,779, Cl. 179-1.0DM.
GF Business Equipment, Inc.: *See—*
Textoris, Melvin A.; and Wahl, William, 4,041,881, Cl. 108-159.000.
Gibert, Alain; and Camps, Roger, to Societe Nationale des Petroles d'Aquitaine. Device for measuring the mass of particles of an aerosol per volume unit. 4,041,768, Cl. 73-28.000.
Gill, Theodore: *See—*
Taich, Albert; and Gill, Theodore, 4,041,772, Cl. 73-45.600.
Gillard, G. Bruce, co-executor: *See—*
Stepien, George, Jr.; Califano, Frank L., deceased; DeLorenzo, William, Jr., co-executor; Gillard, G. Bruce, co-executor; Russell, Thomas E., deceased; and Russell, Florence P., executrix, 4,041,712, Cl. 61-36.00R.
Gillstrom, Uno K. Marking machine. 4,041,859, Cl. 101-111.000.
Gillyns, Emile: *See—*
Bell, Robert Glenn; Gillyns, Emile; and McDaniel, Olin Kilpatrick, Jr., 4,042,569, Cl. 260-75.00T.
Ginaven, Marvin E., to Bauer Bros. Co., The. Low profile static screen. 4,042,511, Cl. 210-386.000.
Gindi, Abraham M., to International Business Machines Corporation. Method and apparatus for byte and frame synchronization on a loop system coupling a CPU channel to bulk storage devices. 4,042,783, Cl. 179-15.0AL.
Giolito, Francois; and Rivier, Georges, to Orogil. Novel lubricating compositions containing derivatives of 1,2-dithiol-3-thiones or 1,2-dithiol-3-ones. 4,042,514, Cl. 252-48.600.
Glassmeyer, John J.; and Hughes, Howard W., to Pullman Incorporated. Stake post and cap arrangement for trailer. 4,042,275, Cl. 296-43.000.
Glazer, Emmett Jean; and Smith, Edwin Studley, to Goodyear Tire & Rubber Company, The. Process of purifying vinyl chloride. 4,042,637, Cl. 260-652.00P.
Glorioso, Paul A., to TRW Inc. Welding apparatus. 4,042,800, Cl. 219-98.000.
Gluhlampenfabrik A.G.: *See—*
Heimlicher, Peter, 4,041,683, Cl. 57-18.000.
Goebel, Franz; and Marincic, Nikola, to GTE Laboratories Incorporated. Electrochemical cells. 4,042,756, Cl. 429-94.000.
Goering, Kenneth Justin; and Eslick, Robert Freeman, to Research Corporation. Processing of starch. 4,042,414, Cl. 127-32.000.
Goloff, Alexander; and Sommars, Mark Frederick, to Caterpillar Tractor Co. Rubber torsional vibration damper with cooling means. 4,041,803, Cl. 74-574.000.
Gomann, Jurgen: *See—*
Wahle, Gunter; Ludszewéit, Dieter; Gomann, Jurgen; and Zessin, Horst, 4,041,958, Cl. 131-84.00B.
Gonsior, Leonhard: *See—*
Bachl, Robert; Frielingsdorf, Hans; Gruber, Wolfgang; Mueller-Tamm, Heinz; and Gonsior, Leonhard, 4,042,770, Cl. 526-106.000.
Gonzalez-Dorner, Alberto Carlos: *See—*
Dahm, Manfred; and Gonzalez-Dorner, Alberto Carlos, 4,042,537, Cl. 260-2.5AP.
Goodman, James P.: *See—*
Kellenbenz, Carl W.; Goodman, James P.; and Rector, Randall C., 4,042,830, Cl. 307-40.000.
Goodman, Lawrence Alan: *See—*
Hanak, Joseph John; Friel, Ronald Norman; and Goodman, Lawrence Alan, 4,042,293, Cl. 350-160.0LC.
Goodrich, George E.: *See—*
Cain, Earl S.; Carlson, Jerome A.; and Goodrich, George E., 4,042,283, Cl. 308-15.000.
Goodyear Tire & Rubber Company, The: *See—*
Alsobrook, Clarence B., 4,042,002, Cl. 152-354.000.

Gaskill, Gerald E.; and Woodlee, James E., 4,042,003, Cl. 152-381.200.
Glazer, Emmett Jean; and Smith, Edwin Studley, 4,042,637, Cl. 260-652.00P.
Graven, Andrew A.; Ronyak, David M.; and Bose, Edward B., 4,041,652, Cl. 51-241.00R.
Hoback, Ronald D., 4,041,789, Cl. 74-229.000.
Hoback, Ronald D.; and Geist, Joseph C., 4,042,443, Cl. 156-349.000.
Houck, Stanley J., 4,042,435, Cl. 156-121.000.
Klar, Kenneth K., 4,041,806, Cl. 73-159.000.
Lawrence, John P., 4,042,641, Cl. 260-780.000.
Lawrence, John P., 4,042,642, Cl. 260-780.000.

Gordon, Clark B.: *See*—
Rubinstein, Herbert J.; Gordon, Clark B.; Robison, Albert; and Clark, Philip M., 4,042,828, Cl. 250-507.000.

Gordon, Theodore H.; and Kummerle, Herman Fred, to Owens-Illinois, Inc. Oxychlorination process. 4,042,639, Cl. 260-656.00R.

Goren, Alvin J.: *See*—
Gans, Arnold M.; Goren, Alvin J.; and Gorenberg, Eli M., 4,042,687, Cl. 424-177.000.
Gans, Arnold M.; Goren, Alvin J.; and Gorenberg, Eli M., 4,042,688, Cl. 424-177.000.

Gorenberg, Eli M.: *See*—
Gans, Arnold M.; Goren, Alvin J.; and Gorenberg, Eli M., 4,042,687, Cl. 424-177.000.
Gans, Arnold M.; Goren, Alvin J.; and Gorenberg, Eli M., 4,042,688, Cl. 424-177.000.

Goto, Chuichi: *See*—
Misaka, Yasunao; Tanaka, Ikuo; Okada, Hiroo; Goto, Chuichi; Hirota, Moriyuki; Uesugi, Masaaki; and Tsuchiya, Mitsuru, 4,042,500, Cl. 210-189.000.

Goto, Isamu; Nishimura, Sadanori; and Kawahara, Eiichiro, to Honda Giken Kogyo Kabushiki Kaisha. Hydraulic torque converter with a lockup clutch between pump and turbine. 4,041,701, Cl. 60-347.000.

Gotoh, Miyuki, to Nissan Motor Company, Limited. Weft sensor system of sensing malfunction of a weaving loom. 4,041,985, Cl. 139-370.200.

Gotter, Kurt: *See*—
Schnabel, Roland; Holzel, Alexander; and Gotter, Kurt, 4,042,359, Cl. 65-2.000.

Gotze, Christian: *See*—
Heidrich, Gunter; and Gotze, Christian, 4,042,301, Cl. 355-75.000.

Gotzen, Heinrich. Hydraulic grab. 4,042,272, Cl. 294-88.000.

Gould Inc.: *See*—
Hakarine, Duane D., 4,042,762, Cl. 429-187.000.

Gould, Robert A.: *See*—
Stayton, Leroy M.; and Gould, Robert A., 4,041,871, Cl. 102-95.000.

Govan, Ronald M.: *See*—
Ho, William W.; and Govan, Ronald M., 4,042,879, Cl. 324-58.50C.

GOW-MAC Instruments, Inc.: *See*—
Martin, A. J. P.; Miller, James M.; Mathieu, Robert J.; and Lawson, Alexander E., Jr., 4,042,304, Cl. 356-128.000.

Graf, Robert E.: *See*—
Krohn, David A.; Graf, Robert E.; and Deeg, Emil W., 4,042,405, Cl. 106-52.000.

Gratani, Francesco; and Binaghi, Marco, to Montedison S.p.A. Photodegradable polymeric compositions having high thermal stability containing a halogenated quinone and a transition metal compound. 4,042,764, Cl. 526-4.000.

Grau, Gerhard; and Mayer, Otto, to Zinser Textilmaschinen GmbH. Process and apparatus for reattachment of a thread in an open-end spinning machine. 4,041,685, Cl. 57-34.00R.

Graven, Andrew A.; Ronyak, David M.; and Bose, Edward B., to Goodyear Tire & Rubber Company, The. Apparatus for engraving the sidewall of a tire. 4,041,652, Cl. 51-241.00R.

Gray, Benjamin. Building material. 4,042,406, Cl. 106-88.000.

Graybiel, Lynn Allan: *See*—
Birney, Richard Eugene; Davis, Michael Ian; Graybiel, Lynn Allan; Hood, Robert Allen; Kahn, Samuel; and Osborne, William Steese, 4,042,913, Cl. 364-200.000.

Greb, William H., to General Motors Corporation. Pneumatic tension gauge. 4,041,779, Cl. 73-144.000.

Green, Stanley, to Lucas Electrical Company Limited, The. Lamp assembly. 4,042,818, Cl. 240-41.300.

Greene, Janice L., to Standard Oil Company, The. Process for producing 2-pyrrolidone. 4,042,599, Cl. 260-326.5FN.

Gregoire, Mark Charles: *See*—
Boyle, James Alfred; Galins, Peteris Adams; Gregoire, Mark Charles; and O'Toole, Peter L. M., 4,042,197, Cl. 244-183.000.

Gregory, Charles E.; Brian, Michael; Thomas, Jerald F.; and Cameron, James F., to Jered Industries, Inc. Vacuum flush water closet. 4,041,554, Cl. 4-10.000.

Greinacher, Ekkehard: *See*—
Brugger, Wilhelm; and Greinacher, Ekkehard, 4,042,672, Cl. 423-419.00R.

Grell, Wolfgang: *See*—
Griss, Gerhart; Grell, Wolfgang; Hurnaus, Rudolf; Sauter, Robert; Eisele, Bernhard; Kaubisch, Nikolaus; and Leitold, Matyas, 4,042,711, Cl. 424-319.000.

Griffith, Cecil B.: *See*—
Zavaras, Alexander A.; Sobolewski, Robert; and Griffith, Cecil B., 4,042,007, Cl. 164-49.000.

Griffith, Donald P. Urine collection device. 4,042,337, Cl. 23-259.000.

Griffith, William J.: *See*—
Falterman, Charles W.; Griffith, William J.; and Gryting, Harold J., 4,042,430, Cl. 149-19.300.

Griss, Gerhart; Grell, Wolfgang; Hurnaus, Rudolf; Sauter, Robert; Eisele, Bernhard; Kaubisch, Nikolaus; and Leitold, Matyas, to Boehringer Ingelheim GmbH. Derivatives of biphenyloxy-lower alkanoic acids, salts thereof and their use as antihyperlipidemics. 4,042,711, Cl. 424-319.000.

Groebke, Wolfgang, to Sandoz Ltd. Phenylazophenyl dyes having an alkoxyacylamino group on the coupling component radical. 4,042,580, Cl. 260-207.000.

Groome, Ernest J., to Clupak, Inc. Method of manufacturing nip roll for treating web materials. 4,042,437, Cl. 156-212.000.

Grosseau, Albert, to Societe Anonyme Automobiles Citroen. Reciprocating internal combustion engine. 4,041,924, Cl. 123-193.0CP.

Grosskopf, John W., Jr.: *See*—
King, Roger P.; Grosskopf, John W., Jr.; and Bondelier, Francis C., Jr., 4,042,364, Cl. 65-168.000.

Grotloh, Karlheinz, to Sulzer Brothers Limited. Control valve having independently driven valves. 4,041,979, Cl. 137-599.200.

Grotloh, Karlheinz, to Sulzer Brothers Limited. Control valve having two independently driven valves. 4,041,980, Cl. 137-599.200.

Grover, Ross D., to Ram Industries, Inc. Stump eradicator. 4,041,996, Cl. 144-2.00N.

Grubbs, Calvin E.; and Harwell, Jack B., to ECC Corporation. Conversion system with overcurrent protection and start-up circuitry. 4,042,871, Cl. 363-28.000.

Gruber, Wolfgang: *See*—
Bachl, Robert; Frielingsdorf, Hans; Gruber, Wolfgang; Mueller-Tamm, Heinz; and Gonsior, Leonhard, 4,042,770, Cl. 526-106.000.

Grucza, Bernard J., to Warner-Lambert Company. Composition for hydrophilic lens blank and method of casting. 4,042,552, Cl. 260-29.6RB.

Grumman Aerospace Corporation: *See*—
Fulton, James T., 4,042,835, Cl. 307-221.00D.

Grundfos A/S: *See*—
Jensen, Poul Due, 4,042,847, Cl. 310-87.000.

GRUNDIG E.M.V. Elektro-Mechanische Versuchsanstalt Max Grundig: *See*—
Hegendorfer, Max, 4,042,842, Cl. 307-293.000.

Gruner, Ronald Hans; and Alsing, Carl Justin, to Data General Corporation. Microprogram data processing technique and apparatus. 4,042,972, Cl. 364-200.000.

Grunert, Hartmut: *See*—
Schmidt, Joachim; Bamberg, Wolfgang; Grunert, Hartmut; Schorm, Erhard; and Weigelt, Christian, 4,042,502, Cl. 210-59.000.

Gruppo Lepetit S.p.A.: *See*—
White, Richard J.; Lancini, Giancarlo; and Antonini, Piero, 4,042,683, Cl. 424-117.000.

Gryting, Harold J.: *See*—
Falterman, Charles W.; Griffith, William J.; and Gryting, Harold J., 4,042,430, Cl. 149-19.300.

GTE Laboratories Incorporated: *See*—
Goebel, Franz; and Marincic, Nikola, 4,042,756, Cl. 429-94.000.
Krugler, Joel I.; and Nelson, William F., 4,041,642, Cl. 47-58.000.

GTE Sylvania Incorporated: *See*—
Collette, Robert P.; and Wheeler, Robert C., 4,042,858, Cl. 315-379.000.
Hovey, Frederick A.; and Torsch, Charles E., 4,042,857, Cl. 315-368.000.
Johnson, Robert Richard; Coons, Robert Arthur; and Zwald, John Andrew, 4,041,766, Cl. 72-402.000.
Klein, Arthur H., 4,042,959, Cl. 358-167.000.
Kraft, Francis J.; and Puhak, Peter G., 4,042,961, Cl. 358-248.000.

Gueritee, Nicolas. Nicotinic derivatives of estriol. 4,042,581, Cl. 260-239.500.

Guernsey, Richard H., to Eli Lilly and Company. Carton display device. 4,042,110, Cl. 206-459.000.

Guienne, Paul: *See*—
Bertin, Jean Henri; Guienne, Paul; and Lafont, Andre, 4,042,060, Cl. 180-127.000.

Guile, Donald L.: *See*—
Bihuniak, Peter P.; Brandes, Lewis H.; and Guile, Donald L., 4,042,361, Cl. 65-18.000.

Guillet, James Edwin; and Ervin, Dan. Photodegradable polyamide compositions. 4,042,568, Cl. 260-65.000.

Guiney, Aeneas C. Mixing syringe. 4,041,945, Cl. 128-218.00M.

Gularte, David L. Apparatus for bunching broccoli and a method therefor. 4,041,672, Cl. 53-3.000.

Gulati, Suresh T., to Corning Glass Works. Honeycomb structure with high thermal shock resistance. 4,042,738, Cl. 428-116.000.

Guldon Industries, Inc.: *See*—
Cox, Jay Ashton, 4,042,873, Cl. 363-129.000.

Gulf Oil Canada Limited: *See*—
Woods, Hanbury John, 4,042,633, Cl. 260-614.00R.

Gulf Research & Development Company: *See*—
Clampitt, Bert Howard; and Havens, Richard Harry, 4,042,763, Cl. 526-4.000.
Lynch, Thomas J., 4,042,769, Cl. 526-106.000.

Gullichsen, Johan: *See*—
Arhippainen, Bengt; and Gullichsen, Johan, 4,042,452, Cl. 162-60.000.

Gullick Dobson Limited: *See*—
Allen, Archelaius Dawson, 4,041,714, Cl. 61-45.00D.

Gundyrev, Alexei Alexandrovich: *See*—
Kazakova, Ljudmila Petrovna; Gundyrev, Alexei Alexandrovich; Rudakova, Nina Yakovlevna; Sharf, Fridrikh-Leopold Khaskelevich; Garun, Yaroslav Evstavievich; Belyashina, Lidia Ivanovna; and Kocheva, Zoya Vasilievna, 4,042,411, Cl. 106-270.000.

Gurwicz, David, to Sevcon Limited. Separately excited D.C. motors. 4,042,865, Cl. 318-338.000.

Gustafsson, Berth Ulrik, to Projectus Industriprodukter AB. Installation for heating a fluid, preferably water, in a conventional central heating system, using the waste heat produced by a number of refrigerators. 4,041,724, Cl. 62-175.000.

Gustafsson, Sven G., to Raytheon Company. Tracking system for multiple beam antenna. 4,042,931, Cl. 343-117.00R.

Gustavsson, John Kenneth Crister, to Aktiebolaget Electrolux. Household compactor for waste materials. 4,041,858, Cl. 100-229.00A.

Gutkowski, Robert F.: *See*—
Horwitz, Norman H.; and Gutkowski, Robert F., 4,041,994, Cl. 141-1.000.

Gygli, Walter, to Haemmerle, A. G. Maschinenfabrik. Stop mechanism for a bending press, plate shear or the like machines. 4,041,704, Cl. 60-473.000.

Gyromat Corporation, The: *See*—
Wiggins, Richard F., 4,042,734, Cl. 427-424.000.

Gysi, Rose Eleanor. Air filter unit for sliding sash windows. 4,042,357, Cl. 55-417.000.

Gysling, Henry James; and Leiental, Mark, to Eastman Kodak Company. Formazan images by physical development of catalytic metal nuclei image. 4,042,392, Cl. 96-48.0PD.

Haas, Ernst; Martin, Joachim; Reuschel, Konrad; and Schnoeller, Manfred, to Siemens Aktiengesellschaft. Method of producing homogeneously doped n-type Si monocrystals by thermal neutron radiation. 4,042,454, Cl. 176-10.000.

Haas, Gregory M.: *See*—
Weinstein, David H.; Keeney, Joe W.; and Haas, Gregory M., 4,042,758, Cl. 429-111.000.

Habegger, Willy: *See*—
Maraux, Jean, 4,042,216, Cl. 254-190.00R.

Habiger, Cyril W., to Caterpillar Tractor Co. Control system for a fluid drive vehicle. 4,041,702, Cl. 60-431.000.

Hackett, Kenneth R., to Sontrix Division of Pittway Corporation. Transducer assembly and method for radiating and detecting energy over controlled beam width. 4,042,845, Cl. 310-322.000.

Haemmerle, A. G. Maschinenfabrik: *See*—
Gygli, Walter, 4,041,704, Cl. 60-473.000.

Haga, Kaoru: *See*—
Nikaido, Teruji; Haga, Kaoru; and Fujiwara, Yasutaka, 4,042,969, Cl. 361-107.000.

Hage, Jacob M., to M.C.P. Industries, Inc. Multiple metallic layers including tin-cobalt containing alloy layer, with plastic substrate. 4,042,752, Cl. 428-626.000.

Hakarine, Duane D., to Gould Inc. Handle for plastic batteries. 4,042,762, Cl. 429-187.000.

Hake, Kenneth A., to Kent Manufacturing Co., Inc. Multiple section farm implement with biased swinging arm structure for attaching reinforcing member to main frame. 4,042,045, Cl. 172-311.000.

Hakes, Dewey R., to Caterpillar Tractor Co. Winch control mechanism. 4,042,215, Cl. 254-187.400.

Hall, David A., to Eli Lilly and Company. Electrolytic process for 7-methoxy-3-exomethylenecepham compounds. 4,042,472, Cl. 204-73.00R.

Hall, Jairus Donn: *See*—
Evans, Seth F.; and Hall, Jairus Donn, 4,041,865, Cl. 102-20.000.

Hall, John Emmett, to Downs Surgical Limited. Surgical implant spinal screw. 4,041,939, Cl. 128-69.000.

Hall, John H., to Micro Power Systems, Inc. High temperature refractory metal contact assembly and multiple layer interconnect structure. 4,042,953, Cl. 357-71.000.

Hall, Sidney B.: *See*—
Niehaus, Howard E.; Hass, Winfield M.; Alpha, Homer G.; Hall, Sidney B.; and Traenkner, Frederick O., 4,042,227, Cl. 266-93.000.

Hallatt, William E.: *See*—
Abelson, Paul N.; Buell, Halsey W.; and Hallatt, William E., 4,042,559, Cl. 260-38.000.

Hallen, Jan-Ake. Service unit, particularly for a doctor's or a dentist's office. 4,042,287, Cl. 312-209.000.

Halliburton Company: *See*—
Anderson, Buddy W.; Bowles, Bobby K.; Murphey, Joseph R.; Totty, Kenneth D.; and Young, Bill M., 4,042,032, Cl. 166-276.000.
Mosher, John E., 4,042,810, Cl. 235-150.200.

Halprin, Robert W.: *See*—
McCown, Thomas E.; McClymonds, Ken A.; and Halprin, Robert W., 4,041,872, Cl. 102-105.000.

Halseth, William L.: *See*—
Elliott, Donald P.; and Halseth, William L., 4,041,931, Cl. 128-1.00R.

Hamblett, Victor Hugh, to B & G Hydraulics Limited. Circuit design apparatus. 4,041,616, Cl. 35-19.00R.

Hammers, David E.: *See*—
Albanese, Damian F.; O'Farrell, Frank J.; Hammers, David E.; and Kennedy, Henry R., 4,042,925, Cl. 343-14.000.

Hammerstein, Gerd, to Carl Schnicks & Co. Rolling shutters. 4,042,005, Cl. 160-220.000.

Hammond, John M.; and Brown, Haskell R., Jr. Portable device for stretching and installing carpet. 4,042,211, Cl. 254-57.000.

Hamon Sobelco S.A.: *See*—
Gaurois, Raphael Emile, 4,042,651, Cl. 261-111.000.

Hampton, Robert K. Refuse reclaiming apparatus. 4,042,129, Cl. 214-17.0DB.

Hanak, Joseph John; Friel, Ronald Norman; and Goodman, Lawrence Alan, to RCA Corporation. Liquid crystal devices having diode characteristics. 4,042,293, Cl. 350-160.0LC.

Handley, Douglas: *See*—
Haselden, Geoffrey Gordon; and Handley, Douglas, 4,042,339, Cl. 23-262.000.

Hanemann, Horst J.: *See*—
Loveland, Winton; and Hanemann, Horst J., 4,041,675, Cl. 53-76.000.

Haney, William G.; and Wittmer, Douglas P., to Waters Associates, Inc. Ion-pairing chromatography. 4,042,327, Cl. 23-230.00R.

Hanna, John Edward, to Motorola, Inc. High input impedance amplifier circuit having temperature stable quiescent operating levels. 4,042,886, Cl. 330-23.000.

Hannah, William James: *See*—
Botting, Alden Joseph; Mulcahy, John Michael; and Hannah, William James, 4,042,659, Cl. 264-71.000.

Hanson, Robert B.; and Stephens, James R., to Standard Oil Company (Indiana). Products and process for preparation of polyamides and shaped articles therefrom. 4,042,750, Cl. 428-423.000.

Haque, Riaz-ul; and Murphy, Richard A., to International Foundation of Microbiology. Method of simultaneously cultivating multiple colonies of microorganisms. 4,042,463, Cl. 195-120.000.

Harada, Yuji: *See*—
Hasebe, Sadao; Ono, Hiromitsu; Murata, Minoru; and Harada, Yuji, 4,042,090, Cl. 197-102.000.

Haraguchi, Keisuke, to Asahi Kogaku Kogyo Kabushiki Kaisha. Camera with motor drive. 4,042,942, Cl. 354-171.000.

Harbulak, Edward P.; and Lash, Ronald J., to M&T Chemicals Inc. Brass plating. 4,042,470, Cl. 204-44.000.

Harbulak, Edward P.: *See*—
Lash, Ronald J.; and Harbulak, Edward P., 4,042,451, Cl. 156-664.000.

Harder, Arthur J., Jr., to Coach and Car Equipment Corporation. Monolithic seat cushion and method for producing same. 4,042,663, Cl. 264-45.700.

Hardern, David Norman: *See*—
Lee, Thomas Brian; Hardern, David Norman; and Bantick, John Raymond, 4,042,708, Cl. 424-283.000.

Hardy, Henry; and Balfour, Adrian E., to Compo Industries, Inc. Appliqueing synthetic resins on sheet material. 4,042,433, Cl. 156-87.000.

Harmon, Kenneth B.; and McQuinn, Ted M., to General Motors Corporation. Transmission shift control device system. 4,041,810, Cl. 74-868.000.

Harnischfeger Corporation: *See*—
Brener, Richard F., 4,042,214, Cl. 254-186.00R.

Harnish, Donald P.: *See*—
Smith, Wendell F., Jr.; Eddy, Kenneth L.; and Harnish, Donald P., 4,042,394, Cl. 96-56.000.

Harper, John Everett; and Kell, Louis H., to Garrett Corporation, The. Fuel system pneumatic purge apparatus and method. 4,041,695, Cl. 60-39.020.

Harper, Richard W., to Eli Lilly and Company. Substituted thiadiazolotriazinediones and method of preparation. 4,042,372, Cl. 71-90.000.

Harrington, Robert W. Spin toy. 4,042,247, Cl. 273-141.00A.

Harris, Colin Frank; and Gammon, Michael William, to Metallurgical Processes Ltd.; and I.S.C. Smelting Limited. Condensation of zinc vapor. 4,042,379, Cl. 75-88.000.

Harris, Harry Wayne: *See*—
Esders, Theodore Walter; Schaeffer, James Robert; and Harris, Harry Wayne, 4,042,461, Cl. 195-66.00R.

Harris, James M., to National Semiconductor Corporation. Method for forming gang bonding bumps on integrated circuit semiconductor devices. 4,042,954, Cl. 357-71.000.

Harris, Louis Selig; Pars, Harry George; Sheehan, John Clark; and Razdan, Raj Kumar, to Sharps Associates. Novel heterocyclic esters of benzopyranopyridines. 4,042,694, Cl. 424-248.550.

Harrison, David E. F.; and Doddema, Harmannus J., to Shell Oil Company. Process for the production of micro-organisms. 4,042,458, Cl. 195-28.00R.

Harrison, Geoffrey. Pipe couplings. 4,042,263, Cl. 285-110.000.

Harrison, Michael R.: *See*—
Keeler, Eugene R.; and Harrison, Michael R., 4,041,767, Cl. 73-6.000.

Harsch, Thomas B.; and Dems, Edd, to Hoffmann-La Roche Inc. Multiplexing circuit for liquid crystal display. 4,042,920, Cl. 340-324.00M.

Hart, Marvin Sumner; and Powers, William James, Jr., to Du Pont de Nemours, E. I., and Company. Yarn texturing jet. 4,041,583, Cl. 28-254.000.

Hart, Vincent Joseph: *See*—
Robeson, Robert Ogden; and Hart, Vincent Joseph, 4,041,829, Cl. 84-225.000.

Hartwig, Ernst, to BASF Aktiengesellschaft. Process for the production of 1,4-diaminoanthraquinone-2,3-dinitrile. 4,042,605, Cl. 260-378.000.

Harvey, John D.: *See*—
Dunne, Gerald J.; and Harvey, John D., 4,042,722, Cl. 426-648.000.

Harwell, Jack B.: *See*—
Grubbs, Calvin E.; and Harwell, Jack B., 4,042,871, Cl. 363-28.000.

Haschke, Heinz: *See*—
Hebbel, Gerhard; Krueger, Horst; Haschke, Heinz; and Morlock, Gerhard, 4,042,748, Cl. 428-323.000.

Hasebe, Sadao; Ono, Hiromitsu; Murata, Minoru; and Harada, Yuji, to Canon Kabushiki Kaisha; and K.K. Chiyoda Gurabiya Insatsusha. Key top. 4,042,090, Cl. 197-102.000.

Hasegawa, Katsuji; Takagi, Yukio; Naito, Sachio; Hiraiwa, Kenichi; and Takasu, Eiji, to Meinan Machinery Works, Inc. Method and apparatus for splicing of veneer sheets. 4,042,440, Cl. 156-304.000.

Hasegawa, Mutsuo; Aikawa, Kazuo; and Hayashi, Shinji, to Yoshida Kogyo Kabushiki Kaisha. Process for electrolytically coloring aluminum and aluminum alloys. 4,042,468, Cl. 204-42.000.

Hasegawa, Mutsuo; Imaoka, Toshikazu; and Aikawa, Kazuo, to Yoshida Kogyo Kabushiki Kaisha. Process for electrolytically coloring aluminum and aluminum alloys in gold. 4,042,469, Cl. 204-42.000.

Hasegawa, Mutsuo; Aikawa, Kazuo; and Nagata, Katsuyuki, to Yoshida Kogyo Kabushiki Kaisha. Process for electrolytically coloring aluminum and aluminum alloys. 4,042,471, Cl. 204-58.000.

Haselden, Geoffrey Gordon; and Handley, Douglas, to University of Leeds Industrial Services Limited. Production of nitric acid. 4,042,339, Cl. 23-262.000.

Hashimoto, Yoshihiro; and Isobe, Shinichi, to Fujitsu Fanuc Limited. Pulse distribution method and apparatus. 4,042,812, Cl. 235-151.110.

Haskew, Francis Anthony, to Coal Industry (Patents) Ltd. Methods of and apparatus for controlling hydraulic equipment. 4,041,841, Cl. 91-421.000.

Haslett, Glenn M.; and Blunier, Dennis L., to Caterpillar Tractor Co. Track bushing providing external deposits of wear resistant material. 4,042,282, Cl. 305-11.000.

Hass, Winfield M.: *See*—
Niehaus, Howard E.; Hass, Winfield M.; Alpha, Homer G.; Hall, Sidney B.; and Traenkner, Frederick O., 4,042,227, Cl. 266-93.000.

Hassan, Javathu Kutikaran; and Rabstejnek, Carl Vincent, to International Business Machines Corporation. Workpiece positioning apparatus. 4,042,119, Cl. 214-1.0CM.

Hatch, William Ronald, to Falconbridge Nickel Mines Limited. Cobalt ion exchange process. 4,042,665, Cl. 423-139.000.

Hatley, Kenneth John, to Butterworth Systems Inc. Rotatable brushes. 4,041,565, Cl. 15-200.000.

Hauldren, H. Morris; Claycomb, Jack R.; Chang, Chi-Haung; and DeKerlegand, Deke E., to W. C. Lamb. Ultrasonic inspection apparatus for well operations. 4,041,773, Cl. 73-67.80S.

Hauni-Werke Korber & Co. KG: *See*—
Wahle, Gunter; Ludszeweit, Dieter; Gomann, Jurgen; and Zessin, Horst, 4,041,958, Cl. 131-84.00B.

Hauxwell, Frank; Stansfield, James Frederick; and Topham, Arthur, to Imperial Chemical Industries Limited. Dispersing agents. 4,042,413, Cl. 106-308.00N.

Havens, Richard Harry: *See*—
Clampitt, Bert Howard; and Havens, Richard Harry, 4,042,763, Cl. 526-4.000.

Hayakawa, Hayashi: *See*—
Nishino, Atsushi; Yoshida, Akihiko; and Hayakawa, Hayashi, 4,042,420, Cl. 148-6.000.

Hayashi, Shinji: *See*—
Hasegawa, Mutsuo; Aikawa, Kazuo; and Hayashi, Shinji, 4,042,468, Cl. 204-42.000.

Hayashi, Yoshimasa: *See*—
Sugihara, Kunihiko; Nakajima, Yasuo; and Hayashi, Yoshimasa, 4,041,914, Cl. 123-119.00A.

Hazan, Isidor; and Iacona, Robert N., to Du Pont de Nemours, E. I., and Company. Process for electrocoating an aqueous composition of the reaction product of an epoxy ester resin and a maleinized drying oil blended with a cross-linking agent. 4,042,478, Cl. 204-181.000.

Hazeltine, Barrett; De Meo, Edgar; and Simon, Richard M., to U.S. Billiards, Inc. Color recognition system. 4,042,491, Cl. 209-74.00R.

Head, Victor P.; and Herzl, Peter J., to Fischer & Porter Co. Force-type flowmeter. 4,041,756, Cl. 73-194.00E.

Heath, Allan Burkett: *See*—
Wolfe, Eugene Earl; and Heath, Allan Burkett, 4,041,899, Cl. 118-323.000.

Hebbar, Ranna K.: *See*—
Cestaro, John P.; Hebbar, Ranna K.; and Sokolov, Uriel S., 4,042,177, Cl. 241-20.000.

Hebbel, Gerhard; Krueger, Horst; Haschke, Heinz; and Morlock, Gerhard, to Deutsche Gold- und Silber-Scheideanstalt vormals Roessler. Process for improving coating compositions for paper and paper substitutes by use of poly(hydroxyaldehydocarboxylate) dispersing agent. 4,042,748, Cl. 428-323.000.

Hecox, Spencer S.: *See*—
Bacon, Duane E.; Gattermeir, J. David; Hecox, Spencer S.; and Robb, John J., 4,042,467, Cl. 204-15.000.

Hegendorfer, Max, to GRUNDIG E.M.V. Elektro-Mechanische Versuchsanstalt Max Grundig. Multiple-time-constant integrator or differentiator. 4,042,842, Cl. 307-293.000.

Hehl, Klaus, to Riloga-Werk Julius Schmidt. Mounting and brake assembly for roller blind. 4,042,075, Cl. 188-75.000.

Hehr International Inc.: *See*—
Kwan, Gerald A., 4,042,004, Cl. 160-91.000.

Heiberger, Ernst. Tumbling and polishing machine with planetary rotating drums. 4,041,648, Cl. 51-164.000.

Heidrich, Gunter; and Gotze, Christian, to AGFA-Gevaert, A.G. Apparatus for supporting and positioning webs of photographic material in copying machines. 4,042,301, Cl. 355-75.000.

Heim, Guenther: *See*—
Engl, Alfred; and Heim, Guenther, 4,042,006, Cl. 164-46.000.

Heim, Thomas M., executor: *See*—
Turner, James Wesley, deceased; and Spinks, Ray E., 4,041,580, Cl. 24-265.0AL.

Heimlicher, Peter, to Gluhlampenfabrik A.G. Machine for coiling lamp filaments. 4,041,683, Cl. 57-18.000.

Heinke, Wolfgang; Kirschner, Helmut; and Reimann, Detlef, to Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH. Process for the removal of specific crystal structure defects from semiconductor discs and the product thereof. 4,042,419, Cl. 148-1.500.

Heinonen, Stig Teodor; and Johansson, Gustav Gunnar, to Telefonaktiebolaget L M Ericsson. Plug contact device intended for mounting on circuit cards. 4,042,289, Cl. 339-17.0LC.

Heinze, Helga: *See*—
Backer, Klaus; Heinze, Helga; Luck, Wolfhard; and Spahrkas, Heinrich, 4,042,321, Cl. 8-94.260.

Heller, Wilhelm; and Knorr, Walter, to Fried. Krupp Huttenwerke AG. Rail wheel. 4,042,273, Cl. 295-30.000.

Hellmiss, Otto E.; and Simon, Heinrich, to RHEINSTAHL Aktiengesellschaft. Device for receiving, from a fixed electric connection, adapting to length, and holding conductors for the electric current supply of movable consumers. 4,042,082, Cl. 191-12.20A.

Helms, Howard D., to United States of America, Army. Ability of a monopulse radar to resolve and track jammers passively. 4,042,927, Cl. 343-18.00E.

Henderson, David C.; and Maloney, Kenneth M., to General Electric Company. Alumina coatings for an electric lamp. 4,042,727, Cl. 427-107.000.

Hennekens, Jan L. J. P.: *See*—
Wolters, Jan; and Hennekens, Jan L. J. P., 4,042,630, Cl. 260-586.00R.

Hennessy, James W.; Angel, Henry R.; and Bachenheimer, Bernard O., to Angel Engineering Corporation. Particle count correction. 4,042,808, Cl. 235-92.0PC.

Henning, George J.; McKinney, Lynn B.; and Scalia, Joseph, to Van Dorn Company. Pull tab construction for full panel pull-out ends for easy opening cans. 4,042,144, Cl. 220-273.000.

Henning, Jack A. Wireline actuated tubing cutter. 4,042,019, Cl. 166-55.000.

Henry, James L.: *See*—
Espy, Donald M.; and Henry, James L., 4,042,122, Cl. 214-1.0CM.

Henry Simon Limited: *See*—
Lawton, Bernard Gaskell, 4,042,446, Cl. 156-359.000.

Henson, Glen E.; and Fisher, Milton W., to Robar Mini-Gym, Inc. Exercise apparatus. 4,041,760, Cl. 73-379.000.

Herkes, Daniel Joseph; and Reinwall, Ernest William, Jr., to Illinois Tool Works Inc. Plastic headed fastener assembly. 4,041,834, Cl. 85-45.000.

Herr, Charles H., to Caterpillar Tractor Co. Control system for a modular transmission. 4,041,807, Cl. 74-752.00C.

Herrell, Flavel Deloyd. Mold element for horizontally forming panels. 4,042,205, Cl. 249-189.000.

Herrmann, John A., to Minnesota Mining and Manufacturing Company. Document filming camera. 4,042,298, Cl. 355-40.000.

Herzl, Peter J.: *See*—
Head, Victor P.; and Herzl, Peter J., 4,041,756, Cl. 73-194.00E.

Heusner, Alex: *See*—
Banholzer, Rolf; Bauer, Rudolf; Heusner, Alex; and Schulz, Werner, 4,042,700, Cl. 424-265.000.

Heybourn, Frank: *See*—
Molins, Desmond Walter; Hinchcliffe, Dennis; Clarke, Peter Alec; and Heybourn, Frank, 4,042,112, Cl. 209-73.000.

Heymer, Gero: *See*—
Auel, Theodor; Ulrich, Hannsjorg; Wasel-Nielen, Horst-Dieter; and Heymer, Gero, 4,042,324, Cl. 21-2.70A.

Higgins, Edward D.: *See*—
Rarey, Kenneth W.; Higgins, Edward D.; Hungerford, Donald L.; and Kennedy, John B., Jr., 4,041,901, Cl. 118-621.000.

High, Cliff, to Brotman, Morley. Method and device for dispensing portions of a chain. 4,041,814, Cl. 83-18.000.

Hille, Ernst: *See*—
Paszthory, Emmerich; Hille, Ernst; Seifert, Karl-Gerhard; and Zimmermann, Vincenz, 4,042,622, Cl. 260-562.00K.

Hills, Vernon Elton; and Wu, Leesui, to RCA Corporation. Selectively powered flip-flop. 4,042,841, Cl. 307-272.000.

Hilton, Garrett H.: *See*—
Davis, James W.; and Hilton, Garrett H., 4,041,981, Cl. 137-604.000.

Himoto, Sizuo: *See*—
Kogure, Katsura; Sueda, Noriyoshi; Himoto, Sizuo; Yoshino, Youziro; and Nakagawa, Kunio, 4,042,617, Cl. 260-469.000.

Hinchcliffe, Dennis: *See*—
Molins, Desmond Walter; Hinchcliffe, Dennis; Clarke, Peter Alec; and Heybourn, Frank, 4,042,112, Cl. 209-73.000.

Hingst, Elmer J. Hood-mountable digital speedometer. 4,041,782, Cl. 73-493.000.

Hinton, Reginald A.; Doughty, Kenneth W.; and Kennedy, William N., to General Electric Company. Electrostatic shielding of disc windings. 4,042,900, Cl. 336-70.000.

Hiraga, Masaharu, to Sankyo Electric Company, Limited. Refrigerant compressor. 4,042,309, Cl. 417-269.000.

Hiraiwa, Kenichi: *See*—
Hasegawa, Katsuji; Takagi, Yukio; Naito, Sachio; Hiraiwa, Kenichi; and Takasu, Eiji, 4,042,440, Cl. 156-304.000.
Hirooka, Masaaki: *See*—
Kitamura, Shuji; Kato, Takashi; and Hirooka, Masaaki, 4,042,648, Cl. 260-896.000.
Hirota, Kuniomi; Masumoto, Akio; Ozawa, Hiroshi; Kobayashi, Nobuki; and Honda, Teruo, to Mitsui Toatsu Chemicals, Incorporated. Process for producing thermosetting finishing powders. 4,042,645, Cl. 260-830.00P.
Hirota, Moriyuki: *See*—
Misaka, Yasunao; Tanaka, Ikuo; Okada, Hiroo; Goto, Chuichi; Hirota, Moriyuki; Uesugi, Masaaki; and Tsuchiya, Mitsuru, 4,042,500, Cl. 210-189.000.
Hirsch, Arie L. Composition and method for forming dental restorations. 4,041,607, Cl. 32-8.000.
Hitachi, Ltd.: *See*—
Ando, Shimon, 4,042,161, Cl. 228-102.000.
Araki, Yoshikazu, 4,042,839, Cl. 307-270.000.
Kaji, Tadao; Kamei, Tsuneaki; and Miyamoto, Keiji, 4,042,726, Cl. 427-93.000.
Kano, Tsuyoshi; Nakako, Masaki; Yamamoto, Hajime; and Otomo, Yoshiro, 4,042,527, Cl. 252-301.40H.
Ohira, Takeshi; and Watanabe, Akinori, 4,042,069, Cl. 187-29.00R.
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Hitachi Metals, Ltd.: *See*—
Katakura, Hiroshi; and Yamashita, Keitaro, 4,041,903, Cl. 118-658.000.
Hix, Alfred G. O. Press brake attachment for forming and cutting metal. 4,041,753, Cl. 72-332.000.
Hladio, William F.: *See*—
Thomas, Jerry D.; Hladio, William F.; and Scott, Leo V., 4,042,381, Cl. 75-129.000.
Ho, William W.; and Govan, Ronald M., to Rockwell International Corporation. Microwave aerosol waterometer. 4,042,879, Cl. 324-58.50C.
Hoback, Ronald D., to Goodyear Tire & Rubber Company, The. Belt drive including toothed belts and toothed pulleys of improved tooth configurations. 4,041,789, Cl. 74-229.000.
Hoback, Ronald D.; and Geist, Joseph C., to Goodyear Tire & Rubber Company, The. Flexible matrix for forming a portion of a toothed power transmission belt. 4,042,443, Cl. 156-349.000.
Hochstrasser, Harry T., to Becton, Dickinson and Company. Method and device for detecting cholesterol. 4,042,329, Cl. 23-230.00B.
Hoechst Aktiengesellschaft: *See*—
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Papenfuhs, Theodor, 4,042,582, Cl. 106-288.00Q.
Papenfuhs, Theodor; and Volk, Heinrich, 4,042,611, Cl. 260-439.00R.
Paszthory, Emmerich; Hille, Ernst; Seifert, Karl-Gerhard; and Zimmermann, Vincenz, 4,042,622, Cl. 260-562.00K.
von der Eltz, Hans-Ulrich, 4,041,559, Cl. 8-149.100.
Winkelmann, Erhardt; and Raether, Wolfgang, 4,042,705, Cl. 424-273.00R.
Hoel, Per O.; Korpijaakko, Erkki Pekka; and Moustakas, Matthew A., to CBS Inc. Pneumatic skill game. 4,042,243, Cl. 273-108.000.
Hoepfl, Joseph R.; and Ballendux, Gerardus M., to Allis-Chalmers Corporation. Hydraulic stack valve assembly. 4,041,972, Cl. 137-269.000.
Hofer, Ernst; and Schlichte, Max, to Siemens Aktiengesellschaft. Method and apparatus for improving transmission line characteristics. 4,042,893, Cl. 333-28.00R.
Hofer, Johann: *See*—
Schmidt, Dietrich; Hofer, Johann; Lang, Winfried; and Bildl, Erich, 4,042,331, Cl. 23-230.0PC.
Hofer, Kurt; and Tscheulin, Guenther, to Sandoz Ltd. Nitrogen-containing aromatic heterocyclic compounds as anti-oxidants. 4,042,562, Cl. 260-45.8NT.
Hofer, Kurt, Jr.: *See*—
Hofer, Kurt, Sr.; and Hofer, Kurt, Jr., 4,042,632, Cl. 260-607.0AL.
Hofer, Kurt, Sr.; and Hofer, Kurt, Jr., to Sandoz Ltd. Polyoxy sulfoxides and sulfones as antistatic agents. 4,042,632, Cl. 260-607.0AL.
Hofer, Peter H., to John Z. DeLorean Corporation, The. Composite material and method of forming. 4,042,746, Cl. 428-311.000.
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; and Stendel, Wilhelm, to Bayer Aktiengesellschaft. Method of combatting blowfly larvae. 4,042,690, Cl. 424-200.000.
Hoffman, Dickie D.: *See*—
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Hofheinz, Werner, 4,042,597, Cl. 548-339.000.
Spector, Sidney, 4,042,682, Cl. 424-95.000.
Hofheinz, Werner, to Hoffmann-La Roche Inc. Preparation of 2-(2-hydroxy-2-propyl)-1-methyl-5-nitroimidazole. 4,042,597, Cl. 548-339.000.
Hoheisel, Klaus; and Janocha, Siegfried, to Hoechst Aktiengesellschaft. Stretched tubular film of polyethylene terephthalate. 4,042,565, Cl. 260-47.00C.
Holbrook, R. Patrick, to Album Frames Inc. Frame for exhibiting albums and the like. 4,041,630, Cl. 40-152.100.
Holder, Otis W., to Oakdale Knitting Company. Auxiliary knitting station for hosiery knitting machine. 4,041,735, Cl. 66-133.000.
Holland, Warren E.; and True, Martin E., to Exxon Production Research Company. Combination subsurface safety valve and chemical injector valve. 4,042,033, Cl. 166-310.000.
Hollander, James Fisher. Apparatus and method for indication and measurement of simulated emotional levels. 4,041,617, Cl. 35-22.00R.
Holm, Peter H.; and Quartz, William L., to Schoeller Technical Papers, Inc. Polyolefin coated photographic base and method of producing. 4,042,398, Cl. 96-85.000.
Holzel, Alexander: *See*—
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Honath, Harold F.: *See*—
Terlesky, John; Muller, Hugh Emil; Murphy, John C.; and Honath, Harold F., 4,041,722, Cl. 62-45.000.
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Cassarino, Frank V., Jr.; and Barlow, George J., 4,042,832, Cl. 307-149.000.
Curley, John L.; Dawson, C. William; Parmet, Arthur A.; and Taylor, Donald R., 4,042,914, Cl. 364-200.000.
Honnold, Darrel Lee, to Deere & Company. Rear folding implement. 4,042,044, Cl. 172-311.000.
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Lloyd, William A.; Barone, Salvatore; Hooper, Gerald E.; and McFarland, Keith E., 4,042,939, Cl. 346-153.000.
Hooper, Ralph W.; MacLeod, Douglas A.; and Murray, Clarence G., to Interstate and Ocean Transport Company. Push tug-barge thrust transmittal means. 4,041,888, Cl. 114-248.000.
Hopp, Philip; and Allen, Mort M., to Hopp Press, Inc., The. Signal device. 4,041,629, Cl. 40-130.00R.
Hopp Press, Inc., The: *See*—
Hopp, Philip; and Allen, Mort M., 4,041,629, Cl. 40-130.00R.
Hori, Haruo: *See*—
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Horiba, Ltd.: *See*—
Saitoh, Osamu; Imaki, Masakatu; and Asami, Hazime, 4,042,332, Cl. 23-232.00R.
Horstman, Wilhelm; Meyer, Werner; and Polizzano, Fred F., deceased (by Polizzano, Anita, executrix), to Kabel-und Metallwerke Gutehoffnungshutte Aktiengesellschaft. Strip for covering an elongated mold cavity in a continuous casting machine. 4,042,009, Cl. 164-278.000.
Horwinski, Elwood R., to Automobile Corporation of America. Hybrid powered automobile. 4,042,056, Cl. 180-65.00A.
Horwitz, Norman H.; and Gutkowski, Robert F. Dose dispenser for radioactive gas. 4,041,994, Cl. 141-1.000.
Hosho, Kozo: *See*—
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Houck, Stanley J., to Goodyear Tire & Rubber Company, The. Closed torus wound carcass for a closed torus tire. 4,042,435, Cl. 156-121.000.
Houdaille Industries, Inc.: *See*—
Nelson, Paul Chris, 4,041,817, Cl. 83-139.000.
Houseman, John, to United States of America, National Aeronautics and Space Administration. Combustion engine. 4,041,910, Cl. 123-59.0EC.
Hovey, Frederick A.; and Torsch, Charles E., to GTE Sylvania Incorporated. Cathode ray tube convergence system. 4,042,857, Cl. 315-368.000.
Howard, Hubert M. Mechanism for releasing a toy parachute from a kite string. 4,042,195, Cl. 244-155.00R.
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Asahara, Yoshiyuki; and Izumitani, Tetsuro, 4,042,526, Cl. 252-300.000.
HPM Corporation: *See*—
Bishop, Thomas G., 4,042,660, Cl. 264-77.000.
Hrabak, Frantisek; Hynkova, Vlasta; and Lokaj, Jan, to Czechoslovenska akademie ved. Process for producing of polymers by connecting of polymeric molecules. 4,042,644, Cl. 260-849.000.
Huber, Bernhard Werner, to Bodenseewerk Perkin-Elmer & Co. GmbH. Method and apparatus for automated sampling with an atomic absorption spectrometer. 4,042,303, Cl. 356-85.000.
Huber, Bernhard Werner, to Bodenseewerk Perkin-Elmer & Co. GmbH. Automatic sample preparation device. 4,042,338, Cl. 23-259.000.
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Huber, Rolf: *See*—
Kiehs, Karl; Adolphi, Heinrich; and Huber, Rolf, 4,042,691, Cl. 424-200.000.

Huber, Wolfgang; Saifer, Mark G.; and Williams, Lewis D., to Diagnostic Data, Inc. Alkylated orgotein. 4,042,689, Cl. 424-177.000.
Hudson, Sharon J., Jr.: *See—*
Morse, Robert L.; and Hudson, Sharon J., Jr., 4,041,728, Cl. 62-503.000.
Hughes Aircraft Company: *See—*
Ajioka, James S.; and Tsuda, George I., 4,042,935, Cl. 343-795.000.
Evans, Norol T.; and Wunderlich, Francis J., 4,042,924, Cl. 343-7.00A.
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Hughes, Thomas Philip; and Sherrill, Clark Alexander. Municipal refuse collection system. 4,042,137, Cl. 214-302.000.
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Ristagno, Charles V., to Micro-Display Systems, Inc. Illuminated electro-optical display apparatus. 4,042,294, Cl. 350-60LC.
Humkey, Robert Garnett; Marshall, Donald Raymond; and Ryan, Donald James, to Du Pont de Nemours, E. I., and Company. Apparatus for solids blending. 4,042,220, Cl. 259-95.000.
Humphrey, Richard V. Fiber-reinforced plastic unitized boat hull frame. 4,041,561, Cl. 9-6.00P.
Hungerford, Donald L.: *See—*
Rarey, Kenneth W.; Higgins, Edward D.; Hungerford, Donald L.; and Kennedy, John B., Jr., 4,041,901, Cl. 118-621.000.
Hunsucker, Jerry Hoyt: *See—*
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Finegan, John J., Jr., 4,042,903, Cl. 338-159.000.
Hunt, Robert E.; and Moore, Kenneth L., to United States of America, Navy. Method of making a reticle-lens. 4,042,449, Cl. 156-651.000.
Hunter, Houston W.: *See—*
Dressel, Edwin J.; and Hunter, Houston W., 4,041,717, Cl. 61-72.400.
Hunter, Wood E.: *See—*
Ballweber, Edward G.; and Hunter, Wood E., 4,042,772, Cl. 526-220.000.
Hurnaus, Rudolf: *See—*
Griss, Gerhart; Grell, Wolfgang; Hurnaus, Rudolf; Sauter, Robert; Eisele, Bernhard; Kaubisch, Nikolaus; and Leitold, Matyas, 4,042,711, Cl. 424-319.000.
Hurwitz, Myron Stuart. Single family townhouse units. 4,041,661, Cl. 52-169.400.
Hwa, Stephen C. P., to Xerox Corporation. Method for scraping liquids from a moving surface. 4,042,415, Cl. 134-6.000.
Hydril Company: *See—*
Mott, James D., 4,042,024, Cl. 166-243.000.
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Hrabak, Frantisek; Hynkova, Vlasta; and Lokaj, Jan, 4,042,644, Cl. 260-849.000.
I.P.U. Limited: *See—*
Zeley, Juan Adalberto, 4,042,224, Cl. 266-50.000.
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Harris, Colin Frank; and Gammon, Michael William, 4,042,379, Cl. 75-88.000.
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Mooney, Thomas C.; and Gajajiva, Padej, 4,042,262, Cl. 285-98.000.
Iacona, Robert N.: *See—*
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ICI Australia Limited: *See—*
Martin, Anwyn Margaret; Stewart, Donald Ferguson; and Swanson, Andrew Baikie, 4,042,375, Cl. 75-4.000.
ICI United States Inc.: *See—*
Kendig, Robert N., 4,042,107, Cl. 206-386.000.
Ickes, John C. Fireplace form. 4,042,160, Cl. 126-121.000.
Idaho Concrete Pipe Co., Inc.: *See—*
Fairbanks, Philip R., 4,042,136, Cl. 214-146.500.
IDR, Inc.: *See—*
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Ihara, Susumu: *See—*
Uesugi, Minoru; Ihara, Susumu; and Mizuuchi, Katsumi, 4,041,610, Cl. 33-127.000.
Iida, Hiroshi; and Sasaki, Kenichi, to Nissan Motor Company, Limited. Internal combustion engine and method of operating same. 4,041,916, Cl. 123-119.00A.
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Ikeda, Yoshitaka: *See—*
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Illinois Tool Works Inc.: *See—*
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Imai, Takeshi; Niwa, Tsutomu; and Motani, Kenji, to Nippondenso Co., Ltd. Resin-sealed electrical device. 4,042,955, Cl. 357-72.000.
Imai, Toshihiro: *See—*
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IMC Chemical Group, Inc.: *See—*
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Creasey, Norman Geoffrey; and Pike, Leslie Clark, 4,042,643, Cl. 428-447.000.
Hauxwell, Frank; Stansfield, James Frederick; and Topham, Arthur, 4,042,413, Cl. 106-308.00N.
Smith, Frank, 4,042,753, Cl. 428-651.000.
INA Bearing Company, Inc.: *See—*
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Inaba, Mitugu; Kouguchi, Noriyuki; Kagawa, Masao; Hosho, Kozo; and Teraoka, Yoshiaki, to Toray Industries, Inc. Method of and arrangement for transporting yarn packages. 4,041,686, Cl. 57-34.00R.
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Indiana University Foundation: *See—*
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Industrial Clean Air, Inc.: *See—*
Miller, Edward M., 4,042,356, Cl. 55-341.00R.
Industrial Nucleonics Corporation: *See—*
Eickelberg, John E.; and Rice, James S., 4,042,869, Cl. 318-630.000.
Industrie Pirelli S.p.A.: *See—*
Bergomi, Luciano, 4,042,742, Cl. 428-295.000.
Ingersoll-Rand Company: *See—*
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Inokuchi, Yukio: *See—*
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Inoue, Eiichi; Endo, Ichiro; and Yamanouchi, Teruo, to Canon Kabushiki Kaisha. Process for the preparation of sensitized material for electrophotography. 4,042,388, Cl. 96-1.600.
Inoue, Yoshio: *See—*
Takamizawa, Minoru; Yamamoto, Yasushi; Inoue, Yoshio; Noshiro, Atsumi; and Fujii, Hitoshi, 4,042,613, Cl. 260-448.20B.
Institut de Recherches de la Siderurgie Francaise: *See—*
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Interdyne Company: *See—*
Lewis, Richard A., 4,042,189, Cl. 242-195.000.
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Bequaert, Frank Charles; and Rochester, Nathaniel, 4,042,777, Cl. 179-79.000.
Birney, Richard Eugene; Davis, Michael Ian; Graybiel, Lynn Allan; Hood, Robert Allen; Kahn, Samuel; and Osborne, William Steese, 4,042,913, Cl. 364-200.000.
Bourke, Donall Garraid; and Puttlitz, Frederic John, 4,042,911, Cl. 364-900.000.
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Hassan, Javathu Kutikaran; and Rabstejnek, Carl Vincent, 4,042,119, Cl. 214-1.0CM.
Perry, Francis James; and Vesci, Anthony, 4,042,937, Cl. 346-1.000.
International Flavors & Fragrances Inc.: *See—*
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International Foundation of Microbiology: *See—*
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International Nickel Company, Inc., The: *See—*
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International Paper Company: *See—*
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International Standard Electric Corporation: *See—*
Drake, Cyril Francis; and Amos, Robert Walter James, 4,042,402, Cl. 106-15.00R.
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International Telephone and Telegraph Corporation: *See—*
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Levine, Arnold M., 4,042,891, Cl. 331-1.00R.
November, Milton H., 4,041,769, Cl. 73-32.00A.
Interstate and Ocean Transport Company: *See—*
Hooper, Ralph W.; MacLeod, Douglas A.; and Murray, Clarence G., 4,041,888, Cl. 114-248.000.
Ip, Anthony Kwok-Chun; Koyanagi, Ken; and Tarasuk, Walter Renald, to Canadian General Electric Company Limited. Nuclear fuel string assembly. 4,042,456, Cl. 176-78.000.

Irikura, Tsutomu, to Kyorin Pharmaceutical Co., Ltd. The hypolipidemic agent, 4-(4-chlorobenzyloxy)-benzyl nicotinate and preparation thereof. 4,042,594, Cl. 260-295.50R.
Irvin Industries, Inc.: *See—*
Rain, Lloyd H., 4,041,653, Cl. 52-2.000.
Irvine Ranch Water District: *See—*
Stoyer, Ray L., 4,042,494, Cl. 210-7.000.
Isaac, Eirlys R.: *See—*
Barker, Michael D.; Isaac, Eirlys R.; Kirby, Peter; and Smith, Graham C., 4,042,369, Cl. 71-88.000.
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Ishii, Hiromichi: *See—*
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Ishiwata, Shosuke; and Ozaki, Kaoru, to Asahi Fiber Glass Company Limited. Method of cleaning waste gas containing a fluorine component. 4,042,667, Cl. 423-240.000.
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Isler, Ernst R., to Isler, Helena A. M. Torque transmitting apparatus. 4,041,835, Cl. 74-751.000.
Isler, Helena A. M.: *See—*
Isler, Ernst R., 4,041,835, Cl. 74-751.000.
Isobe, Shinichi: *See—*
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Itanami, Kojiro; and Ishizaki, Masanori, to Chlorella Industry Co., Ltd. Chlorella-culturing apparatus. 4,041,640, Cl. 47-1.400.
Itatani, Hiroshi; Kashima, Mikito; Shiotani, Akinori; Yoshimoto, Hataaki; and Kato, Tetuo, to UBE Industries, Ltd. Intramolecular cyclization in a fatty acid ester solvent. 4,042,603, Cl. 260-346.20M.
Itin, Artur Markovich; and Eremin, Vladimir Fedorovich. Clutch control device for a machine tool. 4,042,087, Cl. 192-99.00S.
Ito, Fumihiko: *See—*
Yasuoka, Yoshio; Ito, Fumihiko; Tsuboi, Kunitada; Jinno, Kaori; and Yamano, Masaru, 4,042,851, Cl. 315-39.510.
Ito, Haruo, to Aikoh Co., Ltd. Method for defoaming molten slag. 4,042,410, Cl. 106-117.000.
ITW Limited: *See—*
Clinch, Colin W. F.; James, Peter A. R.; and Tibbett, John H., 4,042,267, Cl. 292-318.000.
Ivanko, Theodore, to Avco Corporation. Bonded gear assembly. 4,042,434, Cl. 156-91.000.
Iwamitsu, Yasuyuki; and Taira, Kataro, to Tekken Construction Co. Ltd. Method and apparatus for starting a tunneling machine from an initial placement within a vertical shaft sunk into the ground and provided with a starting port. 4,041,713, Cl. 61-42.000.
Iwata, Shuzi: *See—*
Yamaguchi, Yoshihiro; Shimohata, Takashi; Kaneda, Tsugio; Kita, Sodai; Fuchino, Yoshihide; Kawauchi, Masashi; Furusawa, Sadayashi; and Iwata, Shuzi, 4,042,380, Cl. 75-124.000.
Izumitani, Tetsuro: *See—*
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Risse, Jean-Claude, 4,042,185, Cl. 242-71.700.
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Schulz, John Carl, 4,042,084, Cl. 192-13.00R.
J. Ray McDermott & Co., Inc.: *See—*
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Jackson, George; and Fieldsend, Terence, to British Steel Corporation. Production of metal strip from powder. 4,042,384, Cl. 75-214.000.
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Mean, Jean-Marie L.; Kraft, Joseph K.; and Jackson, Leigh F., 4,041,845, Cl. 92-85.00A.
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Jacobsen, Finn, to Kamry AB. Method and device for dewatering of suspensions in movement. 4,041,560, Cl. 8-156.000.
Jacquier, Robert R., to Centre d'Etudes Pour l'Industrie Pharmaceutique. Diaminopropanols. 4,042,590, Cl. 260-268.00R.
Jahn, Martin D.; and Balfanz, Glenn F., Jr., to Chicago Metallic Corporation. Clip structure for a concealed grid structure of a suspended ceiling. 4,041,668, Cl. 52-489.000.
James, Peter A. R.: *See—*
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Jane Cabagnero, Ramon. Collapsible frame for carriages. 4,042,274, Cl. 296-1.00B.
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Japan Synthetic Rubber Company Limited: *See—*
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Jarvis, Arthur B., to Bose Corporation. Joining. 4,042,307, Cl. 403-290.000.
Jean Walterscheid GmbH: *See—*
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Jenaer, Glaswerk, Schott & Gen.: *See—*
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Jenn Air Corporation: *See—*
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Jensen, Frank L., to Raymond Lee Organization, Inc., The, a part interest. Drowsing chair pillow. 4,042,278, Cl. 297-397.000.
Jensen, Poul Due, to Grundfos A/S. Liquid-filled submersible electromotor. 4,042,847, Cl. 310-87.000.
Jentsch, Hans G. Method for making plastic bags. 4,041,851, Cl. 93-35.0SB.
Jered Industries, Inc.: *See—*
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Jero, John P.: *See—*
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Jioio, Joseph F.; and Gardner, Willis Howard. Shield element. 4,041,812, Cl. 82-34.00R.
Jiruse, Jaroslav, to Adamovske Strojirny, narodni podnik. Tripping device for printing cylinders. 4,041,862, Cl. 101-218.000.
Jochmann, Dieter, to Klockner-Humboldt-Deutz Aktiengesellschaft. Change gear transmission in group arrangement for motor vehicles, especially for use in agriculture and in the construction field. 4,041,805, Cl. 74-740.000.
Johansson, Arne Boris; Codorniu, Francisco Lorente; and Strandly, Ingvald, to Nordiska Maskinfilt Aktiebolaget. Forming fabric and a method for its manufacture. 4,041,989, Cl. 139-425.00A.
Johansson, Erik Gunnar; Blomberg, Bengt Ture Hubertus; and Elmquist, Bernt Holger. Implement to facilitate removing bacterial coating from the interstitial areas of adjacent teeth and cleaning the crevices therebetween. 4,041,962, Cl. 132-91.000.
Johansson, Gustav Gunnar: *See—*
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John Heathcoat & Company Limited: *See—*
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John Z. DeLorean Corporation, The: *See—*
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Johnson Controls, Inc.: *See—*
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Johnson, Iver L. Apparatus and method for dispensing and reinforcing cementitious materials. 4,042,175, Cl. 239-420.000.
Johnson, John H.; and Weeks, Lloyd E., to Monsanto Company. Creatine phosphokinase determination method. 4,042,462, Cl. 195-103.50R.
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Flam, Eric; and Partyka, Doris Phyliss, 4,041,948, Cl. 128-285.000.
Johnson, Kirby William, to Boeing Company, The. Slot seal for leading edge flap. 4,042,191, Cl. 244-214.000.
Johnson, Marvin M.; and Tabler, Donald C., to Phillips Petroleum Company. Process for separation and recovery of carbon monoxide. 4,042,669, Cl. 423-246.000.
Johnson, Robert Richard; Coons, Robert Arthur; and Zwald, John Andrew, to GTE Sylvania Incorporated. Swaging device for use within a die apparatus. 4,041,766, Cl. 72-402.000.
Johnson, Steven J., to Westinghouse Electric Corporation. Secondary system modeling and method for a nuclear power plant training simulator. 4,042,813, Cl. 235-151.210.
Johnson, William L.: *See—*
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Jones & Attwood Limited: *See—*
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Jones, Ivor Wynn, to Chloride Silent Power Limited. Thermo-electric generators. 4,042,757, Cl. 429-104.000.
Jones, John B., Jr.; and Reeves, Adam A. Combuston method of oil shale retorting. 4,042,485, Cl. 208-11.00R.
Jones, John Leslie, Sr. Fluffed pulp urine trap diaper. 4,041,950, Cl. 128-287.000.
Jones, Lewis O., to Xerox Corporation. Stoichiometric ferrite carriers. 4,042,518, Cl. 252-62.600.
Jones, Richard Calvin; and Anthes, Clifford Charles, to Union Carbide Corporation. Torch with gas actuated starting rod feed device. 4,042,225, Cl. 266-75.000.
Jones, Vercoe C., to Si Handling Systems, Inc. Driverless vehicle turntable system. 4,041,873, Cl. 104-35.000.
Joy Manufacturing Company: *See—*
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Joyce, James M.: *See—*
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Jugle, Don B.; and Lipani, Anthony F., to Xerox Corporation. Filter apparatus. 4,041,902, Cl. 118-653.000.
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Justus, Marvin W.: *See*—
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K.K. Chiyoda Gurabiya Insatsusha: *See*—
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Kabushiki Kaisha Fujikoshi: *See*—
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Kabushiki Kaisha Suwa Seikosha: *See*—
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Kahler, Richard W. Liquid filtered smoking device. 4,041,960, Cl. 131-173.000.
Kahm, Annika Britt. Dietetic beverage. 4,042,684, Cl. 424-153.000.
Kahn, Samuel: *See*—
Birney, Richard Eugene; Davis, Michael Ian; Graybiel, Lynn Allan; Hood, Robert Allen; Kahn, Samuel; and Osborne, William Steese, 4,042,913, Cl. 364-200.000.
Kaiser Aluminum & Chemical Corporation: *See*—
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Kaiser, Bernd-Ulrich; Dhein, Rolf; Rudolph, Hans; and Kuchenmeister, Rolf, to Bayer Aktiengesellschaft. Environmentally harmless stoving lacquer systems based on alkyd resins containing condensed monohydric alcohols. 4,042,547, Cl. 260-22.00R.
Kaji, Tadao; Kamei, Tsuneaki; and Miyamoto, Keiji, to Hitachi, Ltd. Selective oxidation method. 4,042,726, Cl. 427-93.000.
Kakovitch, Thomas S. Mobius toy. 4,042,244, Cl. 273-109.000.
Kalinna, E.: *See*—
Cuvilly, Jean-Pierre, 4,041,658, Cl. 52-39.000.
Kallos, George J., to Dow Chemical Company, The. Method of quantitatively detecting chloromethyl methyl ether and/or bischloromethyl ether with improved sensitivity. 4,042,326, Cl. 23-230.00R.
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Flannelly, William George, 4,042,070, Cl. 188-1.00B.
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Chviruk, Vladimir Petrovich; Koneva, Nina Vasilievna; Kilkinov, Alexandr Afanasievich; Demin, Alexandr Viktorovich; Shipkov, Nikolai Nikolaevich; Kosinsky, Konstantin Alexeevich; Kamarian, Georgy Mikirtychevich; Nemirovsky, Ernest Elizarovich; and Samokhin, Igor Nikolaevich, 4,042,656, Cl. 264-29.500.
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Kaji, Tadao; Kamei, Tsuneaki; and Miyamoto, Keiji, 4,042,726, Cl. 427-93.000.
Kamo, Takeshi: *See*—
Yamazaki, Jun'ichiro; Kamo, Takeshi; and Saito, Yoshiichi, 4,042,479, Cl. 204-192.00F.
Kamp, Heinz, to W. Schlafhorst & Co. Device for automatically joining a thread for spinning. 4,041,684, Cl. 57-34.00R.
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Jacobsen, Finn, 4,041,560, Cl. 8-156.000.
Kane, John L.; and Machlan, George R., to Owens-Corning Fiberglas Corporation. Production of inorganic fibers with inorganic cores. 4,042,360, Cl. 65-11.00W.
Kane, William S.: *See*—
Cardwell, Paul H.; and Kane, William S., 4,042,664, Cl. 423-24.000.
Kanebo, Ltd.: *See*—
Sawa, Yoshio, 4,042,592, Cl. 260-286.00Q.
Kaneda, Tsugio: *See*—
Yamaguchi, Yoshihiro; Shimohata, Takashi; Kaneda, Tsugio; Kita, Sodai; Fuchino, Yoshihide; Kawauchi, Masashi; Furusawa, Sadayashi; and Iwata, Shuzi, 4,042,380, Cl. 75-124.000.
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Terada, Ichiro; Yamada, Tadashi; Nishi, Michio; Uchida, Mitsuo; Sugiyama, Naomasa; Kaneko, Mamoru; and Takeda, Nobuhiko, 4,042,409, Cl. 106-111.000.
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Chiu, Shui Tung; and Kaneko, Tatsuhei, 4,042,728, Cl. 427-212.000.
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Karl Weiss - Giessen, Fabrik Elektrophysikalischer Geraete, Werk Lindenstruth: *See*—
Leunig, Ernst; Schultze, Hans A.; and Pfeifer, Christian, 4,041,777, Cl. 73-118.000.
KARMA division of BRANDT, Inc.: *See*—
Uttech, Raymond, 4,042,151, Cl. 222-129.200.
Kaseberg, Werner: *See*—
Meyer, Hans; Kaseberg, Werner; Eisendick, Horst; and Lucke, Willi, 4,042,902, Cl. 338-128.000.
Kasel, Richard G.; and Brown, Paul C., to Minnesota Mining and Manufacturing Company. Packaging container blank. 4,042,168, Cl. 229-40.000.
Kashima, Mikito: *See*—
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Kashiwagi, Shigeru, to Victor Company of Japan, Limited. Horizontal deflection circuit of a television receiver with means to eliminate generation of dangerous high potential under faulty condition. 4,042,859, Cl. 315-411.000.
Kassai Kabushikikaisha: *See*—
Kassai, Kenzou, 4,042,249, Cl. 280-38.000.
Kassai, Kenzou, to Kassai Kabushikikaisha. Opening system for folding baby carriage. 4,042,249, Cl. 280-38.000.
Kast, Howard B.: *See*—
Coffinberry, George A.; and Kast, Howard B., 4,041,697, Cl. 60-39.28R.
Katakura, Hiroshi; and Yamashita, Keitaro, to Konishiroku Photo Industry Co., Ltd.; and Hitachi Metals, Ltd. Developing device for use in electrophotography. 4,041,903, Cl. 118-658.000.
Kato, Nobuyuki: *See*—
Kojima, Shigeru; Kojima, Kiyoshi; Ohtani, Tadao; Kato, Nobuyuki; Sakamoto, Yoichi; Konno, Isago; Tsukahara, Masaharu; and Kubo, Takao, 4,042,429, Cl. 148-31.550.
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Katona, Joseph W., to Mills Products, Inc. Window unit for oven doors. 4,041,930, Cl. 126-198.000.
Katsumata, Takeshi: *See*—
Shujiro, Shiga; Katsumata, Takeshi; Okamoto, Yasushi; and Nakata, Takashi, 4,042,352, Cl. 55-98.000.
Kaubisch, Nikolaus: *See*—
Griss, Gerhart; Grell, Wolfgang; Hurnaus, Rudolf; Sauter, Robert; Eisele, Bernhard; Kaubisch, Nikolaus; and Leitold, Matyas, 4,042,711, Cl. 424-319.000.
Kaufman, Martin H.: *See*—
Wasserman, Bernard; and Kaufman, Martin H., 4,042,441, Cl. 156-306.000.
Kaul, Bansi Lal, to Sandoz Ltd. Azo dyes having one or two triazinyl- or pyrimidyl-acetic acid ester or amide coupling component radicals. 4,042,577, Cl. 260-153.000.
Kaul, Bansi Lal, to Sandoz Ltd. Naphthoquinone compounds. 4,042,591, Cl. 260-272.000.
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Robertson, Donald Edwin; Urry, Wilbert Herbert; and Kavka, Frank, 4,042,602, Cl. 260-343.410.
Kawahara, Eiichiro: *See*—
Goto, Isamu; Nishimura, Sadanori; and Kawahara, Eiichiro, 4,041,701, Cl. 60-347.000.
Kawai, Yoshio: *See*—
Asano, Kiro; Tamura, Humio; Saito, Tsuyoshi; and Kawai, Yoshio, 4,042,486, Cl. 208-44.000.
Kawakami, Hirotake; Takada, Kantaro; and Fukumoto, Toru, to Sony Corporation. Method of assembling a diaphragm assembly for an electro-acoustic transducer. 4,042,438, Cl. 156-272.000.
Kawasaki Steel Corporation: *See*—
Ohashi, Nobuo; Konishi, Motoyuki; Nishida, Minoru; and Inokuchi, Yukio, 4,042,425, Cl. 148-13.100.
Kawase, Shoji; Shima, Takeo; and Moriyama, Keiichi, to Teijin Limited. Fire-retardant polyamides from naphthalene dicarboxylic reactant and halogenated carboxylic reactant. 4,042,571, Cl. 260-78.00R.
Kawauchi, Masashi: *See*—
Yamaguchi, Yoshihiro; Shimohata, Takashi; Kaneda, Tsugio; Kita, Sodai; Fuchino, Yoshihide; Kawauchi, Masashi; Furusawa, Sadayashi; and Iwata, Shuzi, 4,042,380, Cl. 75-124.000.
Kazakova, Ljudmila Petrovna; Gundyrev, Alexei Alexandrovich; Rudakova, Nina Yakovlevna; Sharf, Fridrikh-Leopold Khaskelevich; Garun, Yaroslav Evstavievich; Belyashina, Lidia Ivanovna; and Kocheva, Zoya Vasilievna. Method of processing food paraffins and uses of obtained products. 4,042,411, Cl. 106-270.000.
Kazura, John A.: *See*—
Germanowski, Frank; and Kazura, John A., 4,042,938, Cl. 346-61.000.
KB-Denver, Inc.: *See*—
Pounds, Walter R., 4,042,439, Cl. 156-292.000.
Keating, Richard T. Deep fat fryer fat saver. 4,041,852, Cl. 99-403.000.
Keeler, Eugene R.; and Harrison, Michael R. Testing apparatus for use in calibrating wristwatches. 4,041,767, Cl. 73-6.000.

Keeney, Joe W.: *See*—
Weinstein, David H.; Keeney, Joe W.; and Haas, Gregory M., 4,042,758, Cl. 429-111.000.
Kefalas A/S: *See*—
Buus, Jorn Lasse Martin; Lassen, Niels; and Bigler, Allan Johan, 4,042,695, Cl. 424-250.000.
Keiser, Keril M. Mobile tower. 4,041,974, Cl. 137-344.000.
Kell, Louis H.: *See*—
Harper, John Everett; and Kell, Louis H., 4,041,695, Cl. 60-39.020.
Kellenbenz, Carl W.; Goodman, James P.; and Rector, Randall C., to United States of America, Navy. Solid state programmable dynamic load simulator. 4,042,830, Cl. 307-40.000.
Kelly, Donald A. Pressure-electrolysis cell-unit. 4,042,481, Cl. 204-270.000.
Kelly, Frank L.; and Tan, Jozef I. Kie Sioe, to Pacesetter Systems Inc. Implantable living tissue stimulator with an improved hermetic metal container. 4,041,955, Cl. 128-419.00P.
Kelly, Robert R.: *See*—
Sheldon, Loren B.; Tomashek, James R.; Kelly, Robert R.; Thale, James S.; Shah, Jashwant C.; and Ward, Donald H., 4,042,123, Cl. 214-2.500.
Kelm, Everett F., to Corning Glass Works. Manufacture of multiple flow path body. 4,041,592, Cl. 29-157.30R.
Kelsey-Hayes Company: *See*—
Bertolasi, Robert B., 4,042,059, Cl. 180-103.00R.
Rozmus, Walter J., 4,041,742, Cl. 72-38.000.
Kemper, Morton L. Press brake guard. 4,041,765, Cl. 72-389.000.
Kendig, Robert N., to ICI United States Inc. Returnable roll shipping container. 4,042,107, Cl. 206-386.000.
Kennedy, David C., to Rohm and Haas Company. Separation of organic compounds by adsorption processes. 4,042,498, Cl. 210-26.000.
Kennedy, Henry R.: *See*—
Albanese, Damian F.; O'Farrell, Frank J.; Hammers, David E.; and Kennedy, Henry R., 4,042,925, Cl. 343-14.000.
Kennedy, John B., Jr.: *See*—
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Kennedy, William N.: *See*—
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Kent Manufacturing Co., Inc.: *See*—
Hake, Kenneth A., 4,042,045, Cl. 172-311.000.
Kershaw, Bernard John, to Du Pont of Canada. Preparation of hexamethylene diamine from 2-cyanocyclopentanone and adiponitrile. 4,042,629, Cl. 260-583.00P.
Kessler, Kurt: *See*—
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Kidd, Earl H., to Outboard Marine Corporation. Mounting arrangement for rotary mower chute extension. 4,041,682, Cl. 56-320.200.
Kiehs, Karl; Koenig, Karl-Heinz; and Fischer, Adolf, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. 2,6-Dinitro-4-trifluoromethylanilines. 4,042,628, Cl. 260-577.000.
Kiehs, Karl; Adolphi, Heinrich; and Huber, Rolf, to BASF Aktiengesellschaft. Succinic acid oximidophosphoric ester insecticides. 4,042,691, Cl. 424-200.000.
Kieley & Mueller, Inc.: *See*—
Lindner, Henry Paul, 4,041,982, Cl. 137-625.300.
Kiesslich, Gunther, to Du Pont de Nemours, E. I., and Company. Photographic element with improved slip. 4,042,399, Cl. 96-87.00R.
Kikuchi, Masafumi: *See*—
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Kilby, Jack S., to Texas Instruments Incorporated. Integrated circuit isolation with mesas and/or insulating substrate. 4,042,948, Cl. 357-49.000.
Kilinskas, William Alphonse: *See*—
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Van den Sype, Jaak Stefaan; Kilinskas, William Alphonse; and Mazzarella, Richard Benedict, 4,042,423, Cl. 148-12.00B.
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Chviruk, Vladimir Petrovich; Koneva, Nina Vasilievna; Kilkinov, Alexandr Afanasievich; Demin, Alexandr Viktorovich; Shipkov, Nikolai Nikolaevich; Kosinsky, Konstantin Alexeevich; Kamarian, Georgy Mikirtychevich; Nemirovsky, Ernest Elizarovich; and Samokhin, Igor Nikolaevich, 4,042,656, Cl. 264-29.500.
Kim, Ki Soo, to Stauffer Chemical Company. Process for removing polymer from reaction mixture. 4,042,542, Cl. 260-6.000.
Kimmich, Klaus, to International Standard Electric Corporation. Electronic arrangement for generating two alternating voltages whose phases are shiftable. 4,041,894, Cl. 118-7.000.
Kimoto, Koichi: *See*—
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Kinart, Gregory John. Archery target. 4,042,240, Cl. 273-102.00B.
King, Roger P.; Grosskopf, John W., Jr.; and Bondelier, Francis C., Jr., to Libbey-Owens-Ford Company. Cleaning apparatus for conveyor rolls. 4,042,364, Cl. 65-168.000.
King, William R., to Kaiser Aluminum & Chemical Corporation. Purification of iron containing acidic solutions. 4,042,501, Cl. 210-51.000.
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Kirschner, Helmut: *See*—
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Kita, Sodai: *See*—
Yamaguchi, Yoshihiro; Shimohata, Takashi; Kaneda, Tsugio; Kita, Sodai; Fuchino, Yoshihide; Kawauchi, Masashi; Furusawa, Sadayashi; and Iwata, Shuzi, 4,042,380, Cl. 75-124.000.
Kitamura, Shuji; Kato, Takashi; and Hirooka, Masaaki, to Sumitomo Chemical Company, Limited. Olefin-acrylic ester copolymer-thermoplastic resin composition. 4,042,648, Cl. 260-896.000.
Klar, Kenneth K., to Goodyear Tire & Rubber Company, The. Testing cord-to-elastomer adhesion. 4,041,806, Cl. 73-159.000.
Klatt, Heinz Jurgen: *See*—
Pusch, Gunter; Klatt, Heinz Jurgen; and Frohlich, Walter, 4,042,026, Cl. 166-258.000.
Kleber, Carl J.: *See*—
Muhler, Joseph C.; Putt, Mark S.; Kleber, Carl J.; and Yoho, Clayton W., 4,042,680, Cl. 424-55.000.
Klein, Arthur H., to GTE Sylvania Incorporated. Noise suppression circuit. 4,042,959, Cl. 358-167.000.
Klitzman, Charles B. Apparatus indicating an absent golf club. 4,042,918, Cl. 340-280.000.
Klockner-Humboldt-Deutz Aktiengesellschaft: *See*—
Decker, Hanns; Pfeiffer, Roland; Wenz, Lothar; and Cordes, Horst, 4,042,492, Cl. 209-223.00R.
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Klockner-Werke AG: *See*—
Langhammer, Hans Jurgen; Abratis, Horst; Schafer, Klaus; Rendel, Klaus-Jurgen; and Lotze, Horst, 4,042,223, Cl. 266-47.000.
Watermann, Willy; and von der Linden, Walter, 4,041,715, Cl. 61-45.00D.
Klopich, Marshall E.: *See*—
Friant, James E.; and Klopich, Marshall E., 4,042,431, Cl. 149-36.000.
Kluczynski, Paul F.: *See*—
Kopczynski, John F.; and Kluczynski, Paul F., 4,042,231, Cl. 269-48.100.
Klund, Robert N.; and Weidenbach, James S., to Delkor Industries, Inc. Stamp and legend applicating machine. 4,042,445, Cl. 156-385.000.
Knapp, Kenneth K., to Eaton Corporation. Hydrostatic transmission with integral auxiliary pump. 4,041,703, Cl. 60-464.000.
Knapp, Randolph H., to Shell Oil Company. Plugging subterranean earth formations with aqueous epoxy emulsions containing fine solid particles. 4,042,031, Cl. 166-276.000.
Knartzer, Jon A.: *See*—
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Knibbs, Robin Keith. Model figures. 4,041,638, Cl. 46-127.000.
Kniel, Ludwig, to Lummus Company, The. Vessel having natural gas liquefaction capabilities. 4,041,721, Cl. 62-45.000.
Knifton, John F., to Texaco Inc. Oxychlorination sources for regenerating dispersions of ligand-stabilized, palladium (II) halide complexes used as carbonylation catalysts. 4,042,530, Cl. 252-415.000.
Knight, John C.; and Wovcha, Merle G., to Upjohn Company, The. Composition of matter and process. 4,042,459, Cl. 195-51.00S.
Knight, Lynn E. Tennis ball holder. 4,042,156, Cl. 224-5.00D.
Knipp, Francis. Time lapse steering controls for self propelled models. 4,041,886, Cl. 114-144.00R.
Knorr-Bremse GmbH: *See*—
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Kobayashi, Hasao: *See*—
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Kobayashi, Nobuki: *See*—
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Kobayashi, Toru: *See*—
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Kobe Steel, Ltd.: *See*—
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Kobinger, Erhard: *See*—
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Koch, George Paul, to Fiat-Allis Construction Machinery, Inc. Steering clutch and single pedal brake control system for crawler tractor. 4,042,052, Cl. 180-6.700.
Koch, Henning: *See*—
Ahrens, Hanns; Koch, Henning; Schroder, Eberhard; Biere, Helmut; and Kapp, Joachim-Friedrich, 4,042,706, Cl. 424-273.00P.
Koch, Paolo; and Perrotti, Emilio, to Snam Progetti S.p.A. Processes

for the production of heterocyclic compounds. 4,042,595, Cl. 260-307.00C.

Kocheva, Zoya Vasilievna: *See—*
Kazakova, Ljudmila Petrovna; Gundyrev, Alexei Alexandrovich; Rudakova, Nina Yakovlevna; Sharf, Fridrikh-Leopold Khaskelevich; Garun, Yaroslav Evstavievich; Belyashina, Lidia Ivanovna; and Kocheva, Zoya Vasilievna, 4,042,411, Cl. 106-270.000.

Koenig, Karl-Heinz: *See—*
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Kogure, Katsura; Sueda, Noriyoshi; Himoto, Sizuo; Yoshino, Youziro; and Nakagawa, Kunio, to Nisshin Flour Milling Co., Ltd. Process for preparing a 2-methyl-(substituted aryl)-pyruvic acid compound. 4,042,617, Cl. 260-469.000.

Koito Seisakusho Co., Ltd.: *See—*
Amano, Shin; and Tanga, Takeshi, 4,042,908, Cl. 340-46.000.

Kojima, Kiyoshi: *See—*
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Kollmann, Jan: *See—*
Brada, Pavel; Kucera, Jaromir; Chladek, Otokar; Voda, Gustav; Novacek, Jindrich; and Kollmann, Jan, 4,041,733, Cl. 66-138.000.

Kollmorgen Technologies Corporation: *See—*
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Komatsu, Tadaaki: *See—*
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Komma, Gerhard; and Schrewe, Hans, to Mannesmann Aktiengesellschaft. Apparatus for withdrawal of continuously cast ingots. 4,042,010, Cl. 164-282.000.

Kommanditbolaget United Stirling (Sweden) AB & Co.: *See—*
Moritz, Mats Inge, 4,041,698, Cl. 60-39.520.

Koneva, Nina Vasilievna: *See—*
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Konishi, Hideki, to Nissan Motor Company Limited. Apparatus to control the recirculation of exhaust gases into the intake passage in an internal combustion engine. 4,041,915, Cl. 123-119.00A.

Konishi, Masami; and Oono, Eishi, to Toyota Jidosha Kogyo Kabushiki Kaisha. Internal combustion engine of lean air-fuel mixture combustion type. 4,041,923, Cl. 123-191.00S.

Konishi, Motoyuki: *See—*
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Konishiroku Photo Industry Co., Ltd.: *See—*
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Katakura, Hiroshi; and Yamashita, Keitaro, 4,041,903, Cl. 118-658.000.
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Konno, Isago: *See—*
Kojima, Shigeru; Kojima, Kiyoshi; Ohtani, Tadao; Kato, Nobuyuki; Sakamoto, Yoichi; Konno, Isago; Tsukahara, Masaharu; and Kubo, Takao, 4,042,429, Cl. 148-31.550.

Koo, Tuh-Kai; and van Velthoven, Armand J., to NCR Corporation. Microelectronic circuit coating system. 4,041,896, Cl. 118-48.000.

Kopacz, Bernard F., to Becton, Dickinson and Company. Sterilizing apparatus. 4,042,805, Cl. 219-492.000.

Kopczynski, John F.; and Kluczynski, Paul F., to CRC - Automatic Welding, Division of Crutcher Resources Corporation. Pipe clamping device. 4,042,231, Cl. 269-48.100.

Koppel, Gary A., to Eli Lilly and Company. Process for preparation of 3-halomethylcephems. 4,042,585, Cl. 544-22.000.

Kordes, Arthur W.: *See—*
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Korpijaakko, Erkki Pekka: *See—*
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Kosenko, Ivan Vasilievich: *See—*
Mischenko, Vladimir Petrovich; Oxenenko, Anatoly Yakovlevich; Mischenko, Vladimir Alexandrovich; Vasiliev, Georgy Konstantinovich; Gavrilenko, Jury Alexandrovich; Povelitsa, Vladimir Vasilievich; and Kosenko, Ivan Vasilievich, 4,041,843, Cl. 91-499.000.

Kosinsky, Konstantin Alexeevich: *See—*
Chviruk, Vladimir Petrovich; Koneva, Nina Vasilievna; Kilkinov, Alexandr Afanasievich; Demin, Alexandr Viktorovich; Shipkov, Nikolai Nikolaevich; Kosinsky, Konstantin Alexeevich; Kamarian, Georgy Mikirtychevich; Nemirovsky, Ernest Elizarovich; and Samokhin, Igor Nikolaevich, 4,042,656, Cl. 264-29.500.

Kostyshin, Maxim Timofeevich: *See—*
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Kouguchi, Noriyuki: *See—*
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Koyanagi, Ken: *See—*
Ip, Anthony Kwok-Chun; Koyanagi, Ken; and Tarasuk, Walter Renald, 4,042,456, Cl. 176-78.000.

Kozak, Theodore Frederick, to Union Carbide Corporation. Flexible waistband diaper. 4,041,949, Cl. 128-287.000.

Koziol, Konrad: *See—*
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Kraft, Derald H., to Aspro, Inc. Method of making V-grooved sheet metal pulleys. 4,041,746, Cl. 72-83.000.

Kraft, Francis J.; and Puhak, Peter G., to GTE Sylvania Incorporated. Electro-optical transducer system. 4,042,961, Cl. 358-248.000.

Kraft, Joseph K.: *See—*
Mean, Jean-Marie L.; Kraft, Joseph K.; and Jackson, Leigh F., 4,041,845, Cl. 92-85.00A.

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DeEdwardo, Andrew H.; Zitomer, Fred; Stackman, Robert W.; and Kramer, Charles E., 4,042,561, Cl. 260-45.9NP.

Krammer, Robert; and McClellan, Michael T., to Standard Conveyor Company. Accumulating conveyor. 4,042,101, Cl. 198-460.000.

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Davis, Duane A.; and Krenick, Michael P., 4,041,815, Cl. 83-30.000.

Kreske, Walter J.: *See—*
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Kress, Robert F., to Dana Corporation. Marine propeller bushing coupling. 4,041,730, Cl. 64-30.00D.

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Krohn, David A.; Graf, Robert E.; and Deeg, Emil W., to American Optical Corporation. High strength ophthalmic lens. 4,042,405, Cl. 106-52.000.

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Krueger, Dennis L., to Minnesota Mining and Manufacturing Company. Reinforced pillowed microfiber webs. 4,042,740, Cl. 428-138.000.

Krueger, Horst: *See—*
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Kruger, Owen Lee, to Nuclear Battery Corporation. Process of making oxygen enriched plutonium dioxide (PuO_2). 4,042,670, Cl. 423-251.000.

Krugler, Joel I.; and Nelson, William F., to GTE Laboratories Incorporated. Process for improving the yield of sugar beets using low intensity light. 4,041,642, Cl. 47-58.000.

Kruse, Robert L., to Monsanto Company. Polymeric polyblends having improved melt flow. 4,042,551, Cl. 260-28.50B.

Kubatec Kunststoff- & Bautechnik AG: *See—*
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Kubo, Takao: *See—*
Kojima, Shigeru; Kojima, Kiyoshi; Ohtani, Tadao; Kato, Nobuyuki; Sakamoto, Yoichi; Konno, Isago; Tsukahara, Masaharu; and Kubo, Takao, 4,042,429, Cl. 148-31.550.

Kucera, Jaromir: *See—*
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Kuchenmeister, Rolf: *See—*
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Kuettner, Klaus E.; Eisenstein, Reuben; and Sorgente, Nino, to Rush-Presbyterian-St. Luke's Medical Center. Preparation of tissue invasion inhibitor and method of treatment utilizing the inhibitor. 4,042,457, Cl. 195-1.800.

Kuhla, Donald E.: *See—*
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Kuhlthau, Hans-Peter, to Bayer Aktiengesellschaft. Process for dyeing anionically modified synthetic fiber materials. 4,042,322, Cl. 8-168.00R.

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Kummerle, Herman Fred: *See*—
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Kurahashi, Akira: *See*—
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Kureha Kagako Kogyo Kabushiki Kaisha: *See*—
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Kurita Water Industries Limited: *See*—
Misaka, Yasunao; Tanaka, Ikuo; Okada, Hiroo; Goto, Chuichi; Hirota, Moriyuki; Uesugi, Masaaki; and Tsuchiya, Mitsuru, 4,042,500, Cl. 210-189.000.
Kwan, Gerald A., to Hehr International Inc. Window assembly. 4,042,004, Cl. 160-91.000.
Kyorin Pharmaceutical Co., Ltd.: *See*—
Irikura, Tsutomu, 4,042,594, Cl. 260-295.50R.
Kypreos, Georges; and Orgeret, Lucien, to Delle-Alsthom. High-voltage electrical installation. 4,042,968, Cl. 361-60.000.
L. B. (Plastics) Limited: *See*—
Litchfield, Leon G., 4,042,288, Cl. 312-330.00R.
L. E. L., Inc.: *See*—
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L.M. Ericsson Pty Ltd.: *See*—
Smith, Peter Leslie, 4,042,921, Cl. 340-347.0AD.
Lach, Dietrich: *See*—
Eilingsfeld, Heinz; and Lach, Dietrich, 4,042,604, Cl. 260-369.000.
Lafont, Andre: *See*—
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Lafont, Guy: *See*—
Trouiller, Jean Claude; and Lafont, Guy, 4,042,907, Cl. 340-15.5BH.
Laforest, Jean; Silhol, Louis; and Renard, Pierre, to Rhone-Poulenc, S.A. Continuous process for the production of maeamic acids. 4,042,620, Cl. 260-518.00R.
L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude: *See*—
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Lambert, John Wesley, Jr., to Tuscarora Cotton Mill. Novelty yarn and method for making same. 4,041,690, Cl. 57-144.000.
Lamm, Gunther: *See*—
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Lammerting, Helmut; Langenhagen, Rolf-Dieter; Rossmy, Gerd; and Zaske, Peter, to Th. Goldschmidt AG. Process for the manufacture of highly elastic soft polyurethane foams. 4,042,540, Cl. 260-2.5AH.
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Land, Edwin H., to Polaroid Corporation. Flat battery. 4,042,760, Cl. 429-162.000.
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Lang, Winfried: *See*—
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Langenhagen, Rolf-Dieter: *See*—
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Langenohl, Willard J. Pump hose retriever. 4,042,184, Cl. 242-47.500.
Langford, Gary O.: *See*—
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Langhammer, Hans Jurgen; Abratis, Horst; Schafer, Klaus; Rendel, Klaus-Jurgen; and Lotze, Horst, to Klockner-Werke AG. Arrangement for and a method of introducing particulate material into molten baths. 4,042,223, Cl. 266-47.000.
Langmack, Charles E., to Niagara Bottle Washer Mfg. Company. Waste liquid renovator. 4,042,507, Cl. 210-158.000.
Lapiere, Charles L.: *See*—
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Lapp, Roger H., to United States of America, Navy. Antenna line scan system for helicopter wire detection. 4,042,933, Cl. 343-761.000.
Lapple, Arnulf Ruediger: *See*—
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Larson, Carl T. Attachment device. 4,041,576, Cl. 24-156.000.
Larson, Charles E.; and Nojiri, Richard T., to Uniroyal, Inc. Compressible offset printing blanket. 4,042,743, Cl. 428-306.000.
Larsson, Hans Gunnar, to ASEA Aktiebolag. High pressure press. 4,041,743, Cl. 72-60.000.
Larsson, Hans Gunnar, to ASEA Aktiebolag. High pressure press. 4,041,744, Cl. 72-60.000.
Larsson, Raymond P., to Bio-Medical Sciences Inc. Time temperature integrating indicator. 4,042,336, Cl. 23-253.0TP.
Lash, Ronald J.; and Harbulak, Edward P., to M&T Chemicals Inc. Selected stripping of nickel-iron alloys from ferrous substrates. 4,042,451, Cl. 156-664.000.
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Latimer, Eugene E.; and Waggoner, John B., to Caterpillar Tractor Co. Filter holding means. 4,042,508, Cl. 210-172.000.
Lawrence, John P., to Goodyear Tire & Rubber Company, The. Inhibiting premature vulcanization of rubbers with N-aryl-hydrocarbyldithio-formimidate. 4,042,641, Cl. 260-780.000.
Lawrence, John P., to Goodyear Tire & Rubber Company, The. Urea additives for sulfur vulcanizable polymers. 4,042,642, Cl. 260-780.000.
Lawson, Alexander E., Jr.: *See*—
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Lawson, Jack M. Drapery marking apparatus. 4,042,154, Cl. 223-28.000.
Lawson, Thomas E.: *See*—
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Lee, Ja Hyun. Hypocycloidal pinch device. 4,042,848, Cl. 313-231.600.
Lee, Thomas Brian; Hardern, David Norman; and Bantick, John Raymond, to Fisons Limited. Pharmaceutical compositions containing 4-carboxy-flavones. 4,042,708, Cl. 424-283.000.
Lee, Young Yee. Tissue paper take-out device. 4,042,147, Cl. 221-225.000.
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Legille, Edouard; and Mailliet, Pierre, to S.A. des Anciens Etablissements Paul Wurth. Charging device for shaft furnace. 4,042,130, Cl. 214-35.00R.
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Weitz, Hans-Martin; Fischer, Rolf; and Lenke, Dieter, 4,042,588, Cl. 544-183.000.
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Leonard, Verna M. Chord fingering coordinator. 4,041,828, Cl. 84-471.00R.
Lepp, David. Hitch assembly. 4,042,256, Cl. 280-512.000.
LePrevost, Dale Alan. Tennis game method and apparatus. 4,042,236, Cl. 273-29.00R.
Lerner, Bernard, to Automated Packaging Systems, Inc. Method of making container strips. 4,041,846, Cl. 93-35.0PC.
Les Fabriques d'Assortiments Reunies: *See*—
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Lesser, Mark B., to Rockwell International Corporation. In-between phase clamping circuit to reduce the effects of positive noise. 4,042,833, Cl. 307-200.00B.
Leszyk, Gerald M.; Morrison, Edward D.; and Williams, Robert F., Jr., to Eastman Kodak Company. Manufacture of plastic parts by radiation molding. 4,042,654, Cl. 264-22.000.
Leunig, Ernst; Schultze, Hans A.; and Pfeifer, Christian, to Karl Weiss - Giessen, Fabrik Elektrophysikalischer Geraete, Werk Lindenstruth. Method and apparatus for testing carburetors. 4,041,777, Cl. 73-118.000.

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Levine, Arnold M., to International Telephone and Telegraph Corporation. Frequency synthesizer having frequency control loop including fiber optic delay line. 4,042,891, Cl. 331-1.00R.

Levinson, Leo; and Wong, Andrew, to Xerox Corporation. Record material feed apparatus. 4,042,091, Cl. 197-138.00R.

Lewis, George D., to United Technologies Corporation. Combustion temperature control. 4,041,694, Cl. 60-39.020.

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Li, Chien C.: *See*—
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Lile, Barbara A.; Lane, Robert M.; and Everhart, Louise A., to L. E. L., Inc. Extremity holder for mounting on an operating table. 4,042,232, Cl. 269-328.000.

Lill, Arnulf, to Siemens Aktiengesellschaft. Magneto-resistive domain detector for cylinder-domain-transport memory. 4,042,917, Cl. 340-174.0TF.

Lima, Paul J.; and Townsend, Todd V., to Lynch Communication Systems. Method and means for detecting an outgoing failure in a bidirectional communications span and looping the same in response thereto. 4,042,794, Cl. 179-175.30R.

Lin, Chiu-Hong, to Upjohn Company, The. 4,4,5,5-tetrahydro-$PGF_{1\alpha}$ analogs. 4,042,607, Cl. 260-410.90R.

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Lin, Hung C.; and White, Marvin H., to Westinghouse Electric Corporation. N-channel MOS transistor. 4,042,945, Cl. 357-23.000.

Lin, Kou Chi; and Dobson, LeRoy E., to Westinghouse Electric Corporation. Electrical connections of conductors to a bus bar. 4,042,775, Cl. 174-94.00R.

Lindemann, Martin K., to Chas. S. Tanner Co. Thermosetting vinyl ester emulsion copolymers. 4,042,553, Cl. 260-29.60H.

Lindemann Maschinenfabrik GmbH: *See*—
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Lindgren, Osten, to AB Metall- & Bergprodukter. Process for recovery of re-usable substances from a fixing bath in processes for development and fixing of photographic films and X-ray films. 4,042,473, Cl. 204-109.000.

Lindner, Henry Paul, to Kieley & Mueller, Inc. Double wall plug control valve. 4,041,982, Cl. 137-625.300.

Lindner, Robert L.; and Marshall, Luther E. Wall assembly. 4,041,667, Cl. 52-483.000.

Liner Concrete Machinery Company Limited, The: *See*—
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Lipani, Anthony F.: *See*—
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Litchfield, Leon G., to L. B. (Plastics) Limited. Extruded plastic panel drawers. 4,042,288, Cl. 312-330.00R.

Lloyd, William A.; Barone, Salvatore; Hooper, Gerald E.; and McFarland, Keith E., to Xerox Corporation. Printer/plotter style system for confined installation and method. 4,042,939, Cl. 346-153.000.

Lobb, George W. Platform structure. 4,042,064, Cl. 182-115.000.

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Lobsinger, James R.: *See*—
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Loebs, Richard G.; and Ostrowski, Richard C., to Caterpillar Tractor Co. Apparatus for bonding a bronze bushing on a metallic member. 4,042,204, Cl. 249-57.000.

Loecher, Friedrich: *See*—
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Lotze, Horst: *See*—
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Loveland, Winton; and Hanemann, Horst J., to Loveshaw Corporation, The. Carton sealing machine carton setting up and loading equipment. 4,041,675, Cl. 53-76.000.

Loveshaw Corporation, The: *See*—
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Lubrizol Corporation, The: *See*—
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Lucas Electrical Company Limited, The: *See*—
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Lucas, Joseph E., to Marine Engineering Co., C.A. Method and apparatus for quickly erecting off-shore platforms. 4,041,711, Cl. 61-91.000.

Lucas, Timothy John, to Tate & Lyle Limited. Sugar p-vinylbenzoyl ester and copolymers thereof. 4,042,538, Cl. 260-17.4SG.

Luck, Wolfhard: *See*—
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Lucke, Willi: *See*—
Meyer, Hans; Kaseberg, Werner; Eisendick, Horst; and Lucke, Willi, 4,042,902, Cl. 338-128.000.

Ludszeweit, Dieter: *See*—
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Lummus Company, The: *See*—
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Lundin, Sven Vilhelm Emanuel, to Avenska Utvecklingsaktiebolaget (SU). Connecting lead supports. 4,041,608, Cl. 32-22.000.

Luo, Fang-Chen; and Brody, Thomas P., to Westinghouse Electric Corporation. Flat panel display device with integral thin film transistor control system. 4,042,854, Cl. 315-169.0TV.

Lupattelli, Carlo; and Miotti, Alfredo, to Societa Italiana Telecomunicazioni SIEMENS, S.p.A. Digit storer for telecommunication system. 4,042,784, Cl. 179-18.0EB.

Lyman, George F., to Data Packaging Corporation. Sequential display device. 4,041,627, Cl. 40-97.000.

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Lynch, Thomas J., to Gulf Research & Development Company. Catalysts for the polymerization of ethylene. 4,042,769, Cl. 526-106.000.

Lynn, Paul R. Wire tightening device. 4,041,992, Cl. 140-123.500.

Lyon, Boyce M.: *See*—
Corbin, Thomas F., Jr.; Eskridge, Brewster B.; and Lyon, Boyce M., 4,042,662, Cl. 264-210.00F.

M.C.P. Industries, Inc.: *See*—
Hage, Jacob M., 4,042,752, Cl. 428-626.000.

M&T Chemicals Inc.: *See*—
Harbulak, Edward P.; and Lash, Ronald J., 4,042,470, Cl. 204-44.000.
Lash, Ronald J.; and Harbulak, Edward P., 4,042,451, Cl. 156-664.000.

Maasberg, Wolfgang: *See*—
Veltrup, Elmar Michael; and Maasberg, Wolfgang, 4,042,178, Cl. 251-44.000.

MacArthur, J. Roderick, to Elder Laboratories. Hook assemblage. 4,041,575, Cl. 24-73.0HH.

MacDonald, John P. Marine burial container. 4,041,582, Cl. 27-2.000.

MacDowell, John F.; and Rittler, Hermann L., to Corning Glass Works. Production of glass-ceramic articles. 4,042,362, Cl. 65-33.000.

Machlan, George R.: *See*—
Kane, John L.; and Machlan, George R., 4,042,360, Cl. 65-11.00W.

Macken, John A.: *See*—
Brandewie, Richard A.; Davis, Walter C.; and Macken, John A., 4,042,822, Cl. 250-216.000.

MacLeay, Ronald E.: *See*—
Sheppard, Chester S.; and MacLeay, Ronald E., 4,042,773, Cl. 526-208.000.

MacLeod, Douglas A.: *See*—
Hooper, Ralph W.; MacLeod, Douglas A.; and Murray, Clarence G., 4,041,888, Cl. 114-248.000.

Mader, William G.: *See*—
Bresnahan, Robert A.; Bass, Edward W.; and Mader, William G., 4,041,609, Cl. 32-22.000.

Maeda, Kazuo: *See*—
Yamamoto, Kousuke; Takenaka, Shinji; and Maeda, Kazuo, 4,042,674, Cl. 423-515.000.
Yamamoto, Kousuke; Takenaka, Shinji; Maeda, Kazuo; and Mituta, Michio, 4,042,675, Cl. 423-515.000.

Maeda, Naoyuki: *See*—
Abe, Michio; and Maeda, Naoyuki, 4,041,922, Cl. 123-191.00S.

Maeda, Takeshi; and Okino, Seiki, to Central Glass Co., Ltd. Method and apparatus for coating glass. 4,042,363, Cl. 65-60.00R.

Maekawa, Yuzo: *See*—
Yasuda, Tetuya; Iinuma, Yoshio; and Maekawa, Yuzo, 4,042,861, Cl. 361-400.000.

Magee, Walter L., Jr., to Stauffer Chemical Company. Polymeric alkoxysilanes. 4,042,612, Cl. 260-448.80R.

Magnani, Margery L.: *See*—
Berger, Phill R.; Berger, Joan P.; and Magnani, Margery L., 4,041,585, Cl. 28-149.000.

Magnavox Company, The: *See*—
Mierzwinski, Eugene P., 4,042,821, Cl. 250-216.000.

Mahle, Nels H.: *See*—
Ramstad, Tore; Mahle, Nels H.; and Matalon, Ralph, 4,042,499, Cl. 210-31.00C.
Mailliet, Pierre: *See*—
Legille, Edouard; and Mailliet, Pierre, 4,042,130, Cl. 214-35.00R.
Main, Don R., to Combotronics, Inc. Liquid pump and metering system. 4,042,149, Cl. 222-40.000.
Maloney, Kenneth M.: *See*—
Henderson, David C.; and Maloney, Kenneth M., 4,042,727, Cl. 427-107.000.
Maltby, Frederick. Septic system with level control. 4,042,497, Cl. 210-25.000.
Mandel, Alan F., to Westinghouse Electric Corporation. Elevator system. 4,042,067, Cl. 187-29.00R.
Manghi, Carlo Alberto: *See*—
Rigo, Gualtiero; and Manghi, Carlo Alberto, 4,042,785, Cl. 179-18.0FC.
Mangin, Pierre: *See*—
Avaro, Michel; and Mangin, Pierre, 4,042,771, Cl. 526-124.000.
Manitowoc Company, Inc., The: *See*—
Beduhn, Daniel E.; Morrow, James G., Sr.; and Pech, David J., 4,042,115, Cl. 212-48.000.
Mannesmann Aktiengesellschaft: *See*—
Komma, Gerhard; and Schrewe, Hans, 4,042,010, Cl. 164-282.000.
Manzer, Leo Ernest, to Du Pont de Nemours, E. I., and Company. Process for preparing hydrocarbyl and silahydrocarbyl transition metal dihydrocarbylamides. 4,042,610, Cl. 260-429.300.
Maraux, Jean, to Habegger, Willy. Cable guide. 4,042,216, Cl. 254-190.00R.
Marconi, Walter; Oddo, Nicola; and Degen, Ludwig, to Snam Progetti S.p.A. Method for conditioning fresh and sea waters from oil. 4,042,495, Cl. 210-11.000.
Margaret Mae Cooke: *See*—
Overall, Bob Eugene, 4,042,200, Cl. 248-223.100.
Marincic, Nikola: *See*—
Goebel, Franz; and Marincic, Nikola, 4,042,756, Cl. 429-94.000.
Marine Engineering Co., C.A.: *See*—
Lucas, Joseph E., 4,041,711, Cl. 61-91.000.
Marker, John R., Jr.: *See*—
Selin, Howard; and Marker, John R., Jr., 4,042,166, Cl. 229-33.000.
Markusch, Peter: *See*—
Dieterich, Dieter; Markusch, Peter; and Reiff, Helmut, 4,042,536, Cl. 260-2.5AK.
Marshall, Donald Raymond: *See*—
Humkey, Robert Garnett; Marshall, Donald Raymond; and Ryan, Donald James, 4,042,220, Cl. 259-95.000.
Marshall, Luther E.: *See*—
Lindner, Robert L.; and Marshall, Luther E., 4,041,667, Cl. 52-483.000.
Marshall, Peter John: *See*—
Nicholls, Bryan Frederick; and Marshall, Peter John, 4,042,242, Cl. 273-105.200.
Marshino, James B., to Amelect Incorporated. Electronic clock having time indicating light display. 4,041,692, Cl. 58-50.00R.
Martin, A. J. P.; Miller, James M.; Mathieu, Robert J.; and Lawson, Alexander E., Jr., to GOW-MAC Instruments, Inc. Christiansen effect detector. 4,042,304, Cl. 356-128.000.
Martin, Anwyn Margaret; Stewart, Donald Ferguson; and Swanson, Andrew Baikie, to ICI Australia Limited. Roasting process for the direct reduction of ores. 4,042,375, Cl. 75-4.000.
Martin, Eugene G.; and Risser, Dale M., to Victor F. Weaver, Inc. Anatomical section de-boning machine. 4,041,572, Cl. 17-46.000.
Martin, Joachim: *See*—
Haas, Ernst; Martin, Joachim; Reuschel, Konrad; and Schnoeller, Manfred, 4,042,454, Cl. 176-10.000.
Martinez, Anastacio. Release of fishing hook. 4,041,634, Cl. 43-17.200.
Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft: *See*—
Simon, Michael; and Degen, Norbert, 4,041,877, Cl. 104-242.000.
Masci, Saturno Angelo, to Kreske, Walter J. Clothes water extracting machine. 4,041,737, Cl. 68-242.000.
Massachusetts Institute of Technology: *See*—
Kaplow, Roy; and Frank, Robert I., 4,042,417, Cl. 136-89.0PC.
Masumoto, Akio: *See*—
Hirota, Kuniomi; Masumoto, Akio; Ozawa, Hiroshi; Kobayashi, Nobuki; and Honda, Teruo, 4,042,645, Cl. 260-830.00P.
Matalon, Ralph: *See*—
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Mathieu, Robert J.: *See*—
Martin, A. J. P.; Miller, James M.; Mathieu, Robert J.; and Lawson, Alexander E., Jr., 4,042,304, Cl. 356-128.000.
Matovich, Edwin, to Thagard Technology Company. High temperature chemical reactor. 4,042,334, Cl. 23-252.00R.
Matsch, Ladislas Charles; and Drnevich, Raymond Francis, to Union Carbide Corporation. Phosphate removal from BOD-containing wastewater. 4,042,493, Cl. 210-6.000.
Matsuba, Hironori; and Satou, Kazumi, to Furukawa Electric Company, Ltd., The. Water tree free power cable. 4,042,776, Cl. 174-110.00R.
Matsuda, Motonobu; and Beppu, Norio, to Minolta Camera Kabushiki Kaisha. Automatically controlled exposure indicating device for a camera. 4,042,940, Cl. 354-39.000.
Matsuda, Yoshio, to Yoshida Kogyo Kabushiki Kaisha. Stringer for sliding clasp fastener. 4,041,577, Cl. 24-205.16C.
Matsumoto, Seiji; and Fukai, Kiyoshi, to Sakai Chemical Industry Co., Ltd. Bonded magnets containing single crystalline ferrite particles. 4,042,516, Cl. 252-62.540.
Matsuno, Takayoshi. Breathing apparatus flow regulator. 4,041,977, Cl. 137-494.000.
Matsuoka, Kimiaki: *See*—
Ozawa, Masahiro; Komatsu, Tadaaki; and Matsuoka, Kimiaki, 4,042,638, Cl. 260-653.10R.
Matsushita Electric Industrial Co., Ltd.: *See*—
Kojima, Shigeru; Kojima, Kiyoshi; Ohtani, Tadao; Kato, Nobuyuki; Sakamoto, Yoichi; Konno, Isago; Tsukahara, Masaharu; and Kubo, Takao, 4,042,429, Cl. 148-31.550.
Nishino, Atsushi; Yoshida, Akihiko; and Hayakawa, Hayashi, 4,042,420, Cl. 148-6.000.
Matsuyama, Shigeru, to Aikoh Co., Ltd. Monoblock hot tops with aligned fibrous material. 4,042,206, Cl. 249-197.000.
Matsuzawa, Hideo; Otani, Masato; Ishii, Hiromichi; Yamada, Kantaro; and Kobayashi, Hasao, to Mitsubishi Rayon Company, Ltd. Process and catalyst for preparing unsaturated carboxylic acid. 4,042,625, Cl. 260-530.00N.
Matty, Thomas C.: *See*—
Sahasrabudhe, Arun P.; and Matty, Thomas C., 4,042,888, Cl. 330-109.000.
Maudlin, Eugene Wendell, to Borg-Warner Corporation. Evaporator assembly. 4,041,727, Cl. 62-290.000.
Maurer, Fritz: *See*—
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; and Stendel, Wilhelm, 4,042,690, Cl. 424-200.000.
May, John E., to General Electric Company. Metal oxide varistor with improved electrical properties. 4,042,535, Cl. 252-518.000.
Mayer, Otto: *See*—
Grau, Gerhard; and Mayer, Otto, 4,041,685, Cl. 57-34.00R.
Maytag Company, The: *See*—
Mellinger, John C., 4,042,089, Cl. 194-102.000.
Mazel Holdings Limited: *See*—
Williamson, Arthur Gerard, 4,042,182, Cl. 241-207.000.
Mazzarella, Richard Benedict: *See*—
Van Den Sype, Jaak Stefaan; Kilinskas, William Alphonse; Mazzarella, Richard Benedict; and Lightstone, John Bernard, 4,042,421, Cl. 148-12.00E.
Van den Sype, Jaak Stefaan; Kilinskas, William Alphonse; and Mazzarella, Richard Benedict, 4,042,423, Cl. 148-12.00B.
Mazzoni, Renato J., to PPG Industries, Inc. Reducing solar radiation transmittance of installed glazing. 4,041,663, Cl. 52-203.000.
McArthur, Dennis P., to Union Oil Company of California. Thermally stable nickel-alumina catalysts useful for methanation and other reactions and method for the manufacture of said catalysts. 4,042,532, Cl. 252-466.00J.
McCabe, Francis J. Resettable, heat actuatable fire link. 4,041,570, Cl. 16-48.500.
McCarthy, Patrick M.; McTighe, Gilbert T.; and McTighe, Robert T. Oil water separator. 4,042,512, Cl. 210-519.000.
McCarthy, Richard H., to FMC Corporation. Caliper disc brake or the like. 4,042,077, Cl. 188-171.000.
McCartney, Edward O., to Jenn Air Corporation. Ventilated range with plug-in cooking units. 4,042,806, Cl. 219-447.000.
McCauley, Jerry L.: *See*—
Reichow, Keith W.; English, David C.; and McCauley, Jerry L., 4,042,049, Cl. 177-137.000.
McClellan, Michael T.: *See*—
Krammer, Robert; and McClellan, Michael T., 4,042,101, Cl. 198-460.000.
McClurg, Carl D., to Buckeye International, Inc. Wear plate. 4,042,117, Cl. 213-50.500.
McClymonds, Ken A.: *See*—
McCown, Thomas E.; McClymonds, Ken A.; and Halprin, Robert W., 4,041,872, Cl. 102-105.000.
McCorkle, Richard A.; and Joyce, James M., to Research Corporation. Stimulated emission X-ray generator. 4,042,827, Cl. 250-493.000.
McCown, Thomas E.; McClymonds, Ken A.; and Halprin, Robert W., to United States of America, Army. Wrapper, structural shielding device. 4,041,872, Cl. 102-105.000.
McCulloch Corporation: *See*—
Thompson, Stephen E., 4,041,606, Cl. 30-381.000.
McDaniel, Olin Kilpatrick, Jr.: *See*—
Bell, Robert Glenn; Gillyns, Emile; and McDaniel, Olin Kilpatrick, Jr., 4,042,569, Cl. 260-75.00T.
McElhoe, Hubert L. Metal building structure. 4,041,659, Cl. 52-93.000.
McFarland, Douglas F., to Farmhand, Inc. Self-loading and unloading hay bale trailer. 4,042,140, Cl. 214-518.000.
McFarland, Keith E.: *See*—
Lloyd, William A.; Barone, Salvatore; Hooper, Gerald E.; and McFarland, Keith E., 4,042,939, Cl. 346-153.000.
McGee, David L., to Plymak Company, Inc. Veneer clipper. 4,041,820, Cl. 83-356.200.
McIntosh, Colin Leslie, to Du Pont de Nemours, E. I., and Company. Carboxyphosphonate brush control agents. 4,042,650, Cl. 260-924.000.
McKinney, Lynn B.: *See*—
Henning, George J.; McKinney, Lynn B.; and Scalia, Joseph, 4,042,144, Cl. 220-273.000.
McLean, Daniel C.: *See*—
Shaler, Amos J.; and McLean, Daniel C., 4,041,961, Cl. 132-40.000.
McLeod, James A. Static converter having partially gapped transformer. 4,042,872, Cl. 363-20.000.
McNamara, Albert C., Jr. Quasi-indirect monosymmetrical lighting system. 4,042,817, Cl. 240-9.00R.

McNamee, James Arthur, to RCA Corporation. Vibrometer. 4,041,775, Cl. 73-70.200.

McQuinn, Ted M.: *See—*
Harmon, Kenneth B.; and McQuinn, Ted M., 4,041,810, Cl. 74-868.000.

McReynolds, Boone K.: *See—*
Mullen, James W.; McReynolds, Boone K.; and Pace, Herbert D., 4,041,863, Cl. 101-269.000.

McTighe, Gilbert T.: *See—*
McCarthy, Patrick M.; McTighe, Gilbert T.; and McTighe, Robert T., 4,042,512, Cl. 210-519.000.

McTighe, Robert T.: *See—*
McCarthy, Patrick M.; McTighe, Gilbert T.; and McTighe, Robert T., 4,042,512, Cl. 210-519.000.

Mead, Hansel B.; and Callaway, Gary R., to Q-Bit Corporation. Broad band amplifier. 4,042,887, Cl. 330-53.000.

Mean, Jean-Marie L.; Kraft, Joseph K.; and Jackson, Leigh F., to Westinghouse Electric Corporation. Hydraulic elevator apparatus. 4,041,845, Cl. 92-85.00A.

Meat Separator Corporation: *See—*
Beck, Nicholas Robert; Leonard, Gordon C.; and Prince, Jack A., 4,042,176, Cl. 241-24.000.

Medical Engineering Corporation: *See—*
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Meehl, David W.: *See—*
Clark, Leonard R.; and Meehl, David W., 4,042,097, Cl. 211-182.000.

Meek, Ronald Lee: *See—*
Cohen, Richard Lewis; and Meek, Ronald Lee, 4,042,730, Cl. 427-305.000.

Meginnis, George B.; and Sodeberg, Earl W., to General Motors Corporation. Airfoil fabrication. 4,042,162, Cl. 228-106.000.

Meinan Machinery Works, Inc.: *See—*
Hasegawa, Katsuji; Takagi, Yukio; Naito, Sachio; Hiraiwa, Kenichi; and Takasu, Eiji, 4,042,440, Cl. 156-304.000.

Meinhardt, Norman Anthony; and Widmer, Robert, to Lubrizol Corporation, The. Concentrates of N-substituted morpholines. 4,042,513, Cl. 252-47.500.

Melamed, Sidney: *See—*
Forsgren, Klane F.; Melamed, Sidney; and Weiner, Robert S., 4,042,737, Cl. 428-96.000.

Mellinger, John C., to Maytag Company, The. Coin slide apparatus. 4,042,089, Cl. 194-102.000.

Mentrup, Anton; Schromm, Kurt; Thoma, Otto; and Zeile, Karl, to Boehringer Ingelheim GmbH. Pharmaceutical compositions containing a 1-(2-alkyl-3,4-dihydroxy-phenyl)-2-(phenylalkyl-amino)-alkanol-(1) and method of use. 4,042,713, Cl. 424-330.000.

Meratti, Gianattilio. Process and plant for the manufacture of sewn books. 4,041,883, Cl. 112-21.000.

Mercier, Denis L. J. G.: *See—*
Donabin, Claude Jules; and Mercier, Denis L. J. G., 4,042,807, Cl. 235-61.11R.

Merck & Co., Inc.: *See—*
Remy, David C., 4,042,584, Cl. 544-59.000.

Merck Sharp & Dohme (I.A.) Corporation: *See—*
Wasson, Burton Kendall; and Weinstock, Leonard M., 4,042,586, Cl. 544-60.000.

Mercurio, Leonard. Multiple axial pin tumbler lock. 4,041,739, Cl. 70-363.000.

Merrick, James W., to Del Norte Technology, Inc. Radar trilateralization position locators. 4,042,923, Cl. 343-6.5LC.

Metacon AG: *See—*
Nehrlich, Friedrich; and Ruckstuhl, Franz, 4,042,207, Cl. 251-62.000.

Metallurgical Processes Ltd.: *See—*
Harris, Colin Frank; and Gammon, Michael William, 4,042,379, Cl. 75-88.000.

Mettoy Company Limited, The: *See—*
Nicholls, Bryan Frederick; and Marshall, Peter John, 4,042,242, Cl. 273-105.200.

Meyer, Alfred: *See—*
Burckhardt, Urs; and Meyer, Alfred, 4,042,703, Cl. 424-273.00R.

Meyer, Eckhard: *See—*
Akyuerek, Altan; and Meyer, Eckhard, 4,041,602, Cl. 29-588.000.

Meyer, Hans; Kaseberg, Werner; Eisendick, Horst; and Lucke, Willi, to Simprop-Electronic Walter Claas, Firma. Apparatus for controlling two crossed proportional adjusting devices by means of a single control stick. 4,042,902, Cl. 338-128.000.

Meyer, Werner: *See—*
Horstman, Wilhelm; Meyer, Werner; and Polizzano, Fred F., deceased, 4,042,009, Cl. 164-278.000.

Michel, Robert, to Transports-Recherches-Etudes et Groupement d'Interet Economique (Tregie). Vehicle guiding system. 4,041,876, Cl. 104-130.000.

Micro-Display Systems, Inc.: *See—*
Billings, Lawrence A. Jr.; Evanicky, Daniel E.; Hull, V. Joseph; and Ristagno, Charles V., 4,042,294, Cl. 350-60LC.

Micro Power Systems, Inc.: *See—*
Hall, John H., 4,042,953, Cl. 357-71.000.

Midrex Corporation: *See—*
Beggs, Donald, 4,042,226, Cl. 266-88.000.

Miegel, Ralph E., to Du Pont de Nemours, E. I., and Company. Derivatives of carboxy-terminated polybutadienes. 4,042,619, Cl. 260-482.00P.

Mierzwinski, Eugene P., to Magnavox Company, The. Remote control light receiver. 4,042,821, Cl. 250-216.000.

Mikhailovskaya, Ekaterina Vasilievna: *See—*
Voitovich, Igor Danilovich; Kostyshin, Maxim Timofeevich; Mikhailovskaya, Ekaterina Vasilievna; Petrov, Vyacheslav Vasilievich; Romanenko, Petr Fedorovich; and Skuridin, Vladimir Petrovich, 4,042,450, Cl. 156-652.000.

Miller, Arthur F.: *See—*
Callahan, James L.; Miller, Arthur F.; and Shaw, Wilfrid G., 4,042,153, Cl. 222-207.000.

Miller, Bruce B. Control apparatus for variable regulation of lung inflation hold time. 4,041,943, Cl. 128-145.800.

Miller, Calvin L., to Caterpillar Tractor Co. Drive disconnect device. 4,041,792, Cl. 74-405.000.

Miller, Charles P.: *See—*
Miller, David J.; and Miller, Charles P., 4,041,623, Cl. 37-108.00R.

Miller, David J.; and Miller, Charles P., to Miller Formless Co., Inc. Grade cutting machine. 4,041,623, Cl. 37-108.00R.

Miller, Edward M., to Industrial Clean Air, Inc. Bag house cell plate and filter bag attachment thereto. 4,042,356, Cl. 55-341.00R.

Miller Formless Co., Inc.: *See—*
Miller, David J.; and Miller, Charles P., 4,041,623, Cl. 37-108.00R.

Miller, James M.: *See—*
Martin, A. J. P.; Miller, James M.; Mathieu, Robert J.; and Lawson, Alexander E., Jr., 4,042,304, Cl. 356-128.000.

Miller, Richard E. Vehicle protector. 4,041,999, Cl. 150-52.00K.

Mills Products, Inc.: *See—*
Katona, Joseph W., 4,041,930, Cl. 126-198.000.

Mink, George. Fastening device. 4,041,596, Cl. 29-243.530.

Minnesota Mining and Manufacturing Company: *See—*
Herrmann, John A., 4,042,298, Cl. 355-40.000.
Kasel, Richard G.; and Brown, Paul C., 4,042,168, Cl. 229-40.000.
Krueger, Dennis L., 4,042,740, Cl. 428-138.000.
Sandvig, Timothy C., 4,042,749, Cl. 428-412.000.

Minolta Camera Kabushiki Kaisha: *See—*
Matsuda, Motonobu; and Beppu, Norio, 4,042,940, Cl. 354-39.000.

Minto, Luigi: *See—*
D'Agnolo, Armando; and Minto, Luigi, 4,042,098, Cl. 198-393.000.

Miotti, Alfredo: *See—*
Lupattelli, Carlo; and Miotti, Alfredo, 4,042,784, Cl. 179-18.0EB.

Misaka, Yasunao; Tanaka, Ikuo; Okada, Hiroo; Goto, Chuichi; Hirota, Moriyuki; Uesugi, Masaaki; and Tsuchiya, Mitsuru, to Kurita Water Industries Limited. Fluidized-bed type multistage solid-liquid contact apparatus. 4,042,500, Cl. 210-189.000.

Mischenko, Vladimir Alexandrovich: *See—*
Mischenko, Vladimir Petrovich; Oxenenko, Anatoly Yakovlevich; Mischenko, Vladimir Alexandrovich; Vasiliev, Georgy Konstantinovich; Gavrilenko, Jury Alexandrovich; Povelitsa, Vladimir Vasilievich; and Kosenko, Ivan Vasilievich, 4,041,843, Cl. 91-499.000.

Mischenko, Vladimir Petrovich; Oxenenko, Anatoly Yakovlevich; Mischenko, Vladimir Alexandrovich; Vasiliev, Georgy Konstantinovich; Gavrilenko, Jury Alexandrovich; Povelitsa, Vladimir Vasilievich; and Kosenko, Ivan Vasilievich. Axial-piston variable-delivery pump with valve directional control of pressure fluid. 4,041,843, Cl. 91-499.000.

Miskech, Peter, to Oxy Metal Industries Corporation. Method for treating cup-shaped workpieces. 4,042,416, Cl. 134-10.000.

Misumi, Teruyuki: *See—*
Tsushima, Sakae; Misumi, Teruyuki; and Murakoshi, Masahiko, 4,042,496, Cl. 210-23.00R.

Mito, Shigeo, to Kabushiki Kaisha Keihinseiki Seisakusho. Throttle-valve operating device for a carburetor. 4,041,797, Cl. 74-501.00R.

Mitsubishi Chemical Industries Ltd.: *See—*
Fukutani, Hideo; Oba, Hiroshi; Okada, Akane; and Shimizu, Atsuko, 4,042,391, Cl. 96-47.000.
Terada, Ichiro; Yamada, Tadashi; Nishi, Michio; Uchida, Mitsuo; Sugiyama, Naomasa; Kaneko, Mamoru; and Takeda, Nobuhiko, 4,042,409, Cl. 106-111.000.

Mitsubishi Rayon Company, Ltd.: *See—*
Matsuzawa, Hideo; Otani, Masato; Ishii, Hiromichi; Yamada, Kantaro; and Kobayashi, Hasao, 4,042,625, Cl. 260-530.00N.

Mitsui Toatsu Chemicals, Incorporated: *See—*
Hirota, Kuniomi; Masumoto, Akio; Ozawa, Hiroshi; Kobayashi, Nobuki; and Honda, Teruo, 4,042,645, Cl. 260-830.00P.
Yamamoto, Kousuke; Takenaka, Shinji; and Maeda, Kazuo, 4,042,674, Cl. 423-515.000.
Yamamoto, Kousuke; Takenaka, Shinji; Maeda, Kazuo; and Mituta, Michio, 4,042,675, Cl. 423-515.000.

Mittag, Douglas C., to Aurora Equipment Company. Gate. 4,041,646, Cl. 49-385.000.

Mitter & Co.: *See—*
Mitter, Mathias, 4,041,860, Cl. 101-122.000.

Mitter, Mathias, to Mitter & Co. Screen printing machine. 4,041,860, Cl. 101-122.000.

Mituta, Michio: *See—*
Yamamoto, Kousuke; Takenaka, Shinji; Maeda, Kazuo; and Mituta, Michio, 4,042,675, Cl. 423-515.000.

Miyake, Kenji; Kumon, Hiroshi; Zitukane, Yoshimaru; and Akutagawa, Shigeru, to Toyo Kogyo Co., Ltd. Sintering method for making a high carbon ferrous sliding element. 4,042,385, Cl. 75-224.000.

Miyamoto, Keiji: *See—*
Kaji, Tadao; Kamei, Tsuneaki; and Miyamoto, Keiji, 4,042,726, Cl. 427-93.000.

Miyamoto, Noriaki: *See—*
Motobayashi, Kozo; Shimizu, Takeshi; and Miyamoto, Noriaki, 4,041,687, Cl. 57-56.000.

Mizuuchi, Katsumi: *See—*
Uesugi, Minoru; Ihara, Susumu; and Mizuuchi, Katsumi, 4,041,610, Cl. 33-127.000.

Mobil Oil Corporation: *See*—
Savins, Joseph George; Burdyn, Ralph F.; and Waite, Jerry M., 4,042,030, Cl. 166-273.000.

Mobile Product Services, Inc.: *See*—
Dench, Robert H.; and Dervin, Victor J., 4,042,017, Cl. 165-63.000.

Modulus Corporation: *See*—
Payne, William J., 4,041,776, Cl. 73-88.00F.

Moelants, Felix Jan; Dierckx, Jozef Aime; and Depoorter, Henri, to AGFA-Gevaert N.V. Light-absorbing dye for use in photography. 4,042,397, Cl. 96-84.00R.

Moje, Steven William, to Du Pont de Nemours, E. I., and Company. 2-Aryl-3-chloro-2,4,6,7-tetrahydrothiopyrano[4,3-c]-pyrazoles. 4,042,373, Cl. 71-91.000.

Mole, Cecil J.: *See*—
Sterrett, Charles C.; and Mole, Cecil J., 4,042,846, Cl. 310-52.000.

Molinari, Delmo C. Jack stand with safety locking device. 4,042,202, Cl. 248-352.000.

Molins, Desmond Walter; Hinchcliffe, Dennis; Clarke, Peter Alec; and Heybourn, Frank, to Molins Limited. Conveying cigarettes and other rod-like articles. 4,042,112, Cl. 209-73.000.

Molins Limited: *See*—
Molins, Desmond Walter; Hinchcliffe, Dennis; Clarke, Peter Alec; and Heybourn, Frank, 4,042,112, Cl. 209-73.000.

Molinski, Victor Joseph; and Peacock, Frank Raymond, to Union Carbide Corporation. Technetium-99m labeled radiodiagnostic agents for liver and bone marrow scanning and method of preparation. 4,042,676, Cl. 424-1.000.

Molinski, Victor Joseph; and Wilczewski, Joseph Arthur, to Union Carbide Corporation. Technetium-99m labeled radiodiagnostic agents and method of preparation. 4,042,677, Cl. 424-1.000.

Monsanto Company: *See*—
Johnson, John H.; and Weeks, Lloyd E., 4,042,462, Cl. 195-103.50R.
Kruse, Robert L., 4,042,551, Cl. 260-28.50B.

Montedison S.p.A.: *See*—
Gratani, Francesco; and Binaghi, Marco, 4,042,764, Cl. 526-4.000.

Mooney, Thomas C.; and Gajajiva, Padej, to I-T-E Imperial Corporation EFCOR Division. Swivel coupling means for electrical conduits and the like. 4,042,262, Cl. 285-98.000.

Moore Business Forms, Inc.: *See*—
Williams, Rodney E., 4,042,412, Cl. 106-306.000.

Moore, Keith William. Method and apparatus for producing serrated metal bars. 4,041,750, Cl. 72-187.000.

Moore, Kenneth L.: *See*—
Hunt, Robert E.; and Moore, Kenneth L., 4,042,449, Cl. 156-651.000.

Moore, Robert R.; and Eitzen, Vincent E., to American Hospital Supply Corporation. Apparatus for mixing fluids held in tubes. 4,042,218, Cl. 259-72.000.

Moorhead Machinery & Boiler Co.: *See*—
Rasinski, Edward, 4,041,908, Cl. 122-479.00R.

Moorley, George, to Wadkin Limited of Green Lane Works. End-jointing of timber. 4,041,998, Cl. 144-315.00R.

Moosberg, Borje Sigurd, to ABU Aktiebolag. Fishing reel with bearing for level wind shaft. 4,042,186, Cl. 242-84.420.

Moran, James: *See*—
Conway, Bernard W.; and Moran, James, 4,042,453, Cl. 162-108.000.

Moraru, Cornel. Tennis trainer. 4,042,237, Cl. 273-29.00A.

Moreau, Marc, to Trefimetaux. Apparatus for continuous extrusion. 4,041,745, Cl. 72-60.000.

Morel, Thomas, to General Motors Corporation. Jet-driven helmholtz fluid oscillator. 4,041,984, Cl. 137-842.000.

Moriconi, Joseph H.; and Burrows, Louis H., Jr., to Xerox Corporation. Electrostatographic developer mixture containing a thermoset acrylic resin coated carrier. 4,042,517, Cl. 252-62.10P.

Morita, Eiichi; Sato, Hisayuki; and Kobayashi, Toru, to Daihatsu Motor Company, Limited. Method of preparing NC tapes. 4,042,866, Cl. 318-568.000.

Moritz, Mats Inge, to Kommanditbolaget United Stirling (Sweden) AB & Co. External combustion engine with exhaust gas recirculation of constant mass flow rate. 4,041,698, Cl. 60-39.520.

Moriyama, Hideo, to Moriyama Sangyo Kabushiki Kaisha. Pipe connecting apparatus. 4,042,291, Cl. 339-89.00M.

Moriyama, Keiichi: *See*—
Kawase, Shoji; Shima, Takeo; and Moriyama, Keiichi, 4,042,571, Cl. 260-78.00R.

Moriyama Sangyo Kabushiki Kaisha: *See*—
Moriyama, Hideo, 4,042,291, Cl. 339-89.00M.

Morlock, Gerhard: *See*—
Ackermann, Rolf; Morlock, Gerhard; and Stehlik, Gerhard, 4,042,525, Cl. 252-106.000.
Hebbel, Gerhard; Krueger, Horst; Haschke, Heinz; and Morlock, Gerhard, 4,042,748, Cl. 428-323.000.

Morong, William H., III; and Lawson, Thomas E., to Lexington Instrument Corporation. Measurement of oxygen in a fluid sample and apparatus therefor. 4,042,465, Cl. 204-1.00T.

Morozowich, Walter, to Upjohn Company, The. Substituted phenyl esters of PGA_2. 4,042,606, Cl. 260-390.000

Morris, Winfred L.; and Thompson, Donald O., to Rockwell International Corporation. Acoustic data acquisition device. 4,041,774, Cl. 73-67.900.

Morrison, Charles F., Jr.; and Puszman, Alan Z., to Valleylab, Inc. Electrosurgical forceps. 4,041,952, Cl. 128-303.130.

Morrison, Donald E., to General Motors Corporation. Vehicle turbine manual control. 4,041,696, Cl. 60-39.140.

Morrison, Edward D.: *See*—
Leszyk, Gerald M.; Morrison, Edward D.; and Williams, Robert F., Jr., 4,042,654, Cl. 264-22.000.

Morrone, Ross, to Otto Niederer Sons, Inc. Apparatus for arranging articles. 4,042,100, Cl. 198-446.000.

Morrow, James G., Sr.: *See*—
Beduhn, Daniel E.; Morrow, James G., Sr.; and Pech, David J., 4,042,115, Cl. 212-48.000.

Morse, Robert L.; and Hudson, Sharon J., Jr., to Tecumseh Products Company; and Sharon Manufacturing Company. Suction accumulator. 4,041,728, Cl. 62-503.000.

Morton-Norwich Products, Inc.: *See*—
Schwan, Thomas J., 4,042,624, Cl. 260-570.600.

Moser, Rabin, to Xerox Corporation. Roll fuser apparatus. 4,042,804, Cl. 219-216.000.

Moser, Robert: *See*—
Staheli, Paul; and Moser, Robert, 4,041,770, Cl. 73-37.500.

Mosher, John E., to Halliburton Company. Method and apparatus for facilitating control of a railway train. 4,042,810, Cl. 235-150.200.

Motani, Kenji: *See*—
Imai, Takeshi; Niwa, Tsutomu; and Motani, Kenji, 4,042,955, Cl. 357-72.000.

Motobayashi, Kozo; Shimizu, Takeshi; and Miyamoto, Noriaki, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho; and Daiwa Boseki Kabushiki. Device for removing impurities separated from fibers in open end spinning unit. 4,041,687, Cl. 57-56.000.

Motorola, Inc.: *See*—
Davidsohn, Uryon S., 4,042,949, Cl. 357-49.000.
Hanna, John Edward, 4,042,886, Cl. 330-23.000.
Kraybill, Albert Victor, 4,042,952, Cl. 357-68.000.
Pace, W. David, 4,042,834, Cl. 307-220.00R.
Rae, James Wilson, 4,042,883, Cl. 325-477.000.
Sessions, Douglas Charles, 4,041,912, Cl. 123-117.00R.

Mott, James D., to Hydril Company. Subsurface well apparatus having flexing means and method of using same. 4,042,024, Cl. 166-243.000.

Moustakas, Matthew A.: *See*—
Hoel, Per O.; Korpijaakko, Erkki Pekka; and Moustakas, Matthew A., 4,042,243, Cl. 273-108.000.

Mueller, Paul; and Prine, Ray A., to Paul Mueller Company. Hot water system. 4,041,726, Cl. 62-238.000.

Mueller-Tamm, Heinz: *See*—
Bachl, Robert; Frielingsdorf, Hans; Gruber, Wolfgang; Mueller-Tamm, Heinz; and Gonsior, Leonhard, 4,042,770, Cl. 526-106.000.

Muenchinger, Herman G. Blanks for making self-thread forming threaded fasteners. 4,042,342, Cl. 428-585.000.

Muhler, Joseph C.; Putt, Mark S.; Kleber, Carl J.; and Yoho, Clayton W., to Indiana University Foundation. Anticariogenic maloaluminate complexes. 4,042,680, Cl. 424-55.000.

Mulcahy, John Michael: *See*—
Botting, Alden Joseph; Mulcahy, John Michael; and Hannah, William James, 4,042,659, Cl. 264-71.000.

Mullen, James W.; McReynolds, Boone K.; and Pace, Herbert D., to Vidac Corporation. Precision hand label imprinter and dispenser. 4,041,863, Cl. 101-269.000.

Muller, Anton, to Eisen -und Drahtwerk Erlau Aktiengesellschaft. Wear-resistant link for tire chains. 4,042,001, Cl. 152-243.000.

Muller, Ernst-Willi; and Wicke, Manfred, to Bayer Aktiengesellschaft. Continuous solvent-free polymerization of vinyl derivatives. 4,042,768, Cl. 526-65.000.

Muller, Hugh Emil: *See*—
Terlesky, John; Muller, Hugh Emil; Murphy, John C.; and Honath, Harold F., 4,041,722, Cl. 62-45.000.

Muller, Peter, to Fried. Krupp Gesellschaft mit beschrankter Haftung. Coiling device for depositing sliver in canisters. 4,041,574, Cl. 19-159.00R.

Muller, Wolfgang: *See*—
Franke, Johannes; Kessler, Kurt; Muller, Wolfgang; Sauerbier, Heinz; Schneider, Kurt; and Unbehaun, Karl, 4,042,318, Cl. 432-210.000.

Mulloy, Edward B. Medical reference chart. 4,041,853, Cl. 116-131.000.

Munk, Michael: *See*—
Boochever, Evelyn; and Munk, Michael, 4,042,016, Cl. 165-20.000.

Murakami, Norio, to Showa Koji K. K. Cell-box-type noise barrier having large magnitude of transmission loss and noise insulating method. 4,042,061, Cl. 181-33.0HE.

Murakoshi, Masahiko: *See*—
Tsushima, Sakae; Misumi, Teruyuki; and Murakoshi, Masahiko, 4,042,496, Cl. 210-23.00R.

Murata, Hikaru. Open circuit type acceleration/deceleration device. 4,041,836, Cl. 91-29.000.

Murata, Minoru: *See*—
Hasebe, Sadao; Ono, Hiromitsu; Murata, Minoru; and Harada, Yuji, 4,042,090, Cl. 197-102.000.

Murenbeeld, Karel: *See*—
Foster, Peter William; Ferrier, Duncan Cameron; Berry, Thomas; and Murenbeeld, Karel, 4,041,586, Cl. 28-254.000.

Murphey, Joseph R.: *See*—
Anderson, Buddy W.; Bowles, Bobby K.; Murphey, Joseph R.; Totty, Kenneth D.; and Young, Bill M., 4,042,032, Cl. 166-276.000.

Murphy, Edward J., to DeSoto, Inc. Polyethylenic polyethers and solvent soluble copolymers thereof. 4,042,566, Cl. 260-47.0EP.

Murphy, John C.: *See*—
Terlesky, John; Muller, Hugh Emil; Murphy, John C.; and Honath, Harold F., 4,041,722, Cl. 62-45.000.

Murphy, Richard A.: *See*—
Haque, Riaz-ul; and Murphy, Richard A., 4,042,463, Cl. 195-120.000.

Murray, Clarence G.: *See*—
Hooper, Ralph W.; MacLeod, Douglas A.; and Murray, Clarence G., 4,041,888, Cl. 114-248.000.

Murray, Kenneth R., to Towmotor Corporation. Controllable connecting apparatus. 4,042,306, Cl. 403-118.000.

Murray, Ransom James; and Brown, Arthur William, to Associated Portland Cement Manufacturers Limited, The. Hydraulic cements. 4,042,408, Cl. 106-100.000.

Musser, Earl C.: *See*—
Sieren, Gerald E.; and Musser, Earl C., 4,042,053, Cl. 180-51.000.

Myers, Claude K.; and Myers, Gary A. Mixer with screen valve. 4,042,179, Cl. 241-46.110.

Myers, Claude K.; Myers, Gary A.; and Myers, Phillip C. Tilt mixer. 4,042,221, Cl. 259-119.000.

Myers, Earl D., to Ohaus Scale Corporation. Balance beam scale. 4,042,050, Cl. 177-198.000.

Myers, Gary A.: *See*—
Myers, Claude K.; and Myers, Gary A., 4,042,179, Cl. 241-46.110.
Myers, Claude K.; Myers, Gary A.; and Myers, Phillip C., 4,042,221, Cl. 259-119.000.

Myers, Phillip C.: *See*—
Myers, Claude K.; Myers, Gary A.; and Myers, Phillip C., 4,042,221, Cl. 259-119.000.

N L Industries, Inc.: *See*—
Cestaro, John P.; Hebbar, Ranna K.; and Sokolov, Uriel S., 4,042,177, Cl. 241-20.000.

Nabiullin, Faat Khatovich. Chemical source of current and method for its assembly. 4,042,761, Cl. 429-165.000.

Nagata, Katsuyuki: *See*—
Hasegawa, Mutsuo; Aikawa, Kazuo; and Nagata, Katsuyuki, 4,042,471, Cl. 204-58.000.

Nagata, Masaki: *See*—
Abe, Mitsuo; Nagata, Masaki; and Kikuchi, Masafumi, 4,042,548, Cl. 260-23.0XA.

Nagel, Robert H.: *See*—
Saylor, Richard; and Nagel, Robert H., 4,042,958, Cl. 358-141.000.

Naito, Sachio: *See*—
Hasegawa, Katsuji; Takagi, Yukio; Naito, Sachio; Hiraiwa, Kenichi; and Takasu, Eiji, 4,042,440, Cl. 156-304.000.

Nakagawa, Kunio: *See*—
Kogure, Katsura; Sueda, Noriyoshi; Himoto, Sizuo; Yoshino, Youziro; and Nakagawa, Kunio, 4,042,617, Cl. 260-469.000.

Nakagawa, Yoshimasa: *See*—
Edamura, Koji; Nakagawa, Yoshimasa; and Ikeda, Yoshitaka, 4,042,646, Cl. 260-864.000.

Nakajima, Yasuo: *See*—
Sugihara, Kunihiko; Nakajima, Yasuo; and Hayashi, Yoshimasa, 4,041,914, Cl. 123-119.00A.

Nakako, Masaki: *See*—
Kano, Tsuyoshi; Nakako, Masaki; Yamamoto, Hajime; and Otomo, Yoshiro, 4,042,527, Cl. 252-301.40H.

Nakamura, Norihiko, to Toyota Jidosha Kogyo Kabushiki Kaisha. Internal-combustion engine having a sub-combustion chamber. 4,041,909, Cl. 123-32.0SP.

Nakamura, Yuji: *See*—
Seguchi, Koji; Sugita, Minoru; Inada, Kazuyoshi; Tagaya, Kiyoshi; and Nakamura, Yuji, 4,042,487, Cl. 208-48.00R.

Nakata, Masahiro: *See*—
Sato, Ryuichi; Oikawa, Teruo; and Nakata, Masahiro, 4,041,800, Cl. 74-571.00R.

Nakata, Roy; and Johenning, William Joseph, to General Electric Company. Particle trapping sheath coupling for enclosed electric bus apparatus. 4,042,774, Cl. 174-14.00R.

Nakata, Takashi: *See*—
Shujiro, Shiga; Katsumata, Takeshi; Okamoto, Yasushi; and Nakata, Takashi, 4,042,352, Cl. 55-98.000.

Nalco Chemical Company: *See*—
Ballweber, Edward G.; and Hunter, Wood E., 4,042,772, Cl. 526-220.000.

Naphtachimie: *See*—
Avaro, Michel; and Mangin, Pierre, 4,042,771, Cl. 526-124.000.

Napp Systems: *See*—
Okai, Sakuo; and Kimoto, Koichi, 4,042,386, Cl. 96-35.100.

National Research Development Corporation: *See*—
Craven, Peter Graham; and Gerzon, Michael Anthony, 4,042,779, Cl. 179-1.0DM.
Phillips, Courtenay Stanley Goss, 4,042,350, Cl. 55-28.000.
Ward, Gerald Frank; and Wray, Gordon Richard, 4,041,884, Cl. 112-79.00R.

National Semiconductor Corporation: *See*—
Compton, James B.; and Ochi, Sam S., 4,042,836, Cl. 307-251.000.
Harris, James M., 4,042,954, Cl. 357-71.000.
Reed, John A., 4,042,915, Cl. 340-173.00R.

National Steel Corporation: *See*—
Beiser, Carl Adolph, 4,042,426, Cl. 428-667.000.
Niehaus, Howard E.; Hass, Winfield M.; Alpha, Homer G.; Hall, Sidney B.; and Traenkner, Frederick O., 4,042,227, Cl. 266-93.000.

Natsuume, Tadao, to Nippon Zeon Co., Ltd. Hydraulic composition. 4,042,407, Cl. 106-90.000.

Natter, Eckard F.; Weant, George E.; and Lobsinger, James R., to Bendix Corporation, The. Multi-mode radar system. 4,042,922, Cl. 343-5.00W.

Nawracaj, Dennis J., to Western Electric Company, Inc. Method for the selective on-line measuring and controlling of a geometrical parameter of elongated articles. 4,042,724, Cl. 427-9.000.

NCR Corporation: *See*—
Koo, Tuh-Kai; and van Velthoven, Armand J., 4,041,896, Cl. 118-48.000.

Nealy, Robert B. Surfboard leash. 4,041,562, Cl. 9-310.0AA.

Nedila, Walter. Cover for baled hay and the like. 4,041,654, Cl. 52-3.000.

Nehrlich, Friedrich; and Ruckstuhl, Franz, to Metacon AG. Valve operating means for a molten metal container. 4,042,207, Cl. 251-62.000.

Neilsen, Hildaur L. Burring device with oppositely acting deburring elements. 4,041,751, Cl. 72-199.000.

Nejtek, George: *See*—
Steele, William Henry; and Nejtek, George, 4,041,911, Cl. 123-103.00B.

Nelson, Paul Chris, to Houdaille Industries, Inc. Punch holder and stripper combination. 4,041,817, Cl. 83-139.000.

Nelson, Richard P., to General Motors Corporation. Wheel cylinder piston construction. 4,042,080, Cl. 188-361.000.

Nelson, William F.: *See*—
Krugler, Joel I.; and Nelson, William F., 4,041,642, Cl. 47-58.000.

Nemirovsky, Ernest Elizarovich: *See*—
Chviruk, Vladimir Petrovich; Koneva, Nina Vasilievna; Kilkinov, Alexandr Afanasievich; Demin, Alexandr Viktorovich; Shipkov, Nikolai Nikolaevich; Kosinsky, Konstantin Alexeevich; Kamarian, Georgy Mikirtychevich; Nemirovsky, Ernest Elizarovich; and Samokhin, Igor Nikolaevich, 4,042,656, Cl. 264-29.500.

Newell, Dennis E.; and Tyler, Hugh J., to Robertshaw Controls Company. Motor control circuit. 4,042,966, Cl. 361-27.000.

Newman, Douglas A., to Columbia Ribbon and Manufacturing Co., Inc. Duplicating method. 4,042,092, Cl. 197-171.000.

Newman, Douglas A.; and Emerson, Robert T., to Columbia Ribbon and Carbon Manufacturing Co., Inc. Hectograph products and process. 4,042,401, Cl. 106-14.500.

Newman, Douglas A.; and Schlotzhauer, Allan T., to Columbia Ribbon and Carbon Manufacturing Co., Inc. Multiple-color transfer elements and process. 4,042,744, Cl. 428-307.000.

Newsteder, Robert. Siphon starting device. 4,041,971, Cl. 137-148.000.

Niagara Bottle Washer Mfg. Company: *See*—
Langmack, Charles E., 4,042,507, Cl. 210-158.000.

Nicholls, Bryan Frederick; and Marshall, Peter John, to Mettoy Company Limited, The. Resiliently mounted targets rotated by escapement device. 4,042,242, Cl. 273-105.200.

Nichols, Mary V. Book marker employing endless elastic band. 4,041,892, Cl. 116-119.000.

Nicholson, William I. Construction method. 4,041,671, Cl. 52-741.000.

Nicoud, Jean-Claude, to Societe de Vente de l'Aluminium. Electrical conductors of aluminum-based alloys. 4,042,424, Cl. 148-12.70A.

Niehaus, Howard E.; Hass, Winfield M.; Alpha, Homer G.; Hall, Sidney B.; and Traenkner, Frederick O., to Southwire Company; and National Steel Corporation. Method and apparatus for continuously homogenizing and quenching aluminum billets. 4,042,227, Cl. 266-93.000.

Nihon Technical Kabushiki Kaisha: *See*—
Ohashi, Tamaki, 4,041,784, Cl. 74-10.330.

Nihon Yushi Co., Ltd.: *See*—
Edamura, Koji; Nakagawa, Yoshimasa; and Ikeda, Yoshitaka, 4,042,646, Cl. 260-864.000.

Nikaido, Teruji; Haga, Kaoru; and Fujiwara, Yasutaka, to Tokyo Electric Power Co. Ltd.; and Showa Electric Wire & Cable Co. Ltd. Electric cable power transmission lines. 4,042,969, Cl. 361-107.000.

Nikkiso Co., Ltd.: *See*—
Sato, Ryuichi; Oikawa, Teruo; and Nakata, Masahiro, 4,041,800, Cl. 74-571.00R.

Nimerick, Kenneth H.; and Simpson, Benny E., to Dow Chemical Company, The. Composition and method for enhancing dispersibility of water soluble polymers. 4,042,529, Cl. 252-363.500.

Nininger, Nathan Vivien, Jr., to California Progressive Products, Inc. Electrical control for derailleur drive. 4,041,788, Cl. 74-217.00B.

Nippon Gakki Seizo Kabushiki Kaisha: *See*—
Oya, Akiyoshi, 4,041,826, Cl. 84-1.010.
Shimauchi, Minoru; and Onoda, Takashi, 4,041,783, Cl. 73-552.000.

Nippon Kayaku Kabushiki Kaisha: *See*—
Ogawa, Masanobu, 4,042,623, Cl. 260-530.00N.

Nippon Kogaku K.K.: *See*—
Fukino, Kunihiro, 4,042,943, Cl. 354-272.000.

Nippon Zeon Co., Ltd.: *See*—
Natsuume, Tadao, 4,042,407, Cl. 106-90.000.

Nippondenso Co., Ltd.: *See*—
Imai, Takeshi; Niwa, Tsutomu; and Motani, Kenji, 4,042,955, Cl. 357-72.000.

Nischk, Gunther: *See*—
Bernert, Claus-Rudiger; Radlmann, Eduard; and Nischk, Gunther, 4,042,570, Cl. 260-75.00M.

Nishi, Michio: *See*—
Terada, Ichiro; Yamada, Tadashi; Nishi, Michio; Uchida, Mitsuo; Sugiyama, Naomasa; Kaneko, Mamoru; and Takeda, Nobuhiko, 4,042,409, Cl. 106-111.000.

Nishida, Minoru: *See*—
Ohashi, Nobuo; Konishi, Motoyuki; Nishida, Minoru; and Inokuchi, Yukio, 4,042,425, Cl. 148-13.100.

Nishimura, Sadanori: *See*—
Goto, Isamu; Nishimura, Sadanori; and Kawahara, Eiichiro, 4,041,701, Cl. 60-347.000.

Nishino, Atsushi; Yoshida, Akihiko; and Hayakawa, Hayashi, to Matsu-

shita Electric Industrial Co., Ltd. Method of producing manganese oxide solid electrolyte capacitor. 4,042,420, Cl. 148-6.000.
Nissan Motor Company, Limited: *See—*
Gotoh, Miyuki, 4,041,985, Cl. 139-370.200.
Iida, Hiroshi; and Sasaki, Kenichi, 4,041,916, Cl. 123-119.00A.
Konishi, Hideki, 4,041,915, Cl. 123-119.00A.
Sugihara, Kunihiko; Nakajima, Yasuo; and Hayashi, Yoshimasa, 4,041,914, Cl. 123-119.00A.
Nisshin Flour Milling Co., Ltd.: *See—*
Kogure, Katsura; Sueda, Noriyoshi; Himoto, Sizuo; Yoshino, Youziro; and Nakagawa, Kunio, 4,042,617, Cl. 260-469.000.
Nitro Nobel AB: *See—*
Enoksson, Bertil Petrus, 4,041,867, Cl. 102-27.00R.
Niwa, Tsutomu: *See—*
Imai, Takeshi; Niwa, Tsutomu; and Motani, Kenji, 4,042,955, Cl. 357-72.000.
Nohira, Hidetaka, to Toyota Jidosha Kogyo Kabushiki Kaisha. Exhaust gas recirculating system. 4,041,913, Cl. 123-119.00A.
Nojiri, Richard T.: *See—*
Larson, Charles E.; and Nojiri, Richard T., 4,042,743, Cl. 428-306.000.
Noll, Dale A.; Piazza, Giacomo J.; and Young, Robert L., to Corning Glass Works. Method of fabricating a multiple flow path body. 4,041,591, Cl. 29-157.30R.
Nomaki, Koji; and Saoyama, Yoshihito, to Asahi Glass Company Ltd. Solder alloy and soldering process. 4,042,725, Cl. 427-57.000.
Noone, Martin J. Portable emergency fire fighting and rescue elevator. 4,042,066, Cl. 187-6.000.
Nordgren, Gunnar, to Oy. Suomen Vanutehdas - Finnwad Ltd. Feeding and rationing equipment for mechanical wood pulp, production waste and equivalent. 4,042,180, Cl. 241-79.000.
Nordiska Maskinfilt Aktiebolaget: *See—*
Johansson, Arne Boris; Codorniu, Francisco Lorente; and Strandly, Ingvald, 4,041,989, Cl. 139-425.00A.
Norris Industries, Inc.: *See—*
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Norris, Melvin N., to Joy Manufacturing Company. AC-DC Traction drive control system. 4,042,864, Cl. 318-301.000.
Norton Company: *See—*
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Sioui, Richard H.; and Carver, Edgar B., 4,042,346, Cl. 51-298.00A.
Sioui, Richard H., 4,042,347, Cl. 51-298.00R.
Noshiro, Atsumi: *See—*
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Nourse, Jack T. Window control devices. 4,041,645, Cl. 49-347.000.
Novacek, Jindrich: *See—*
Brada, Pavel; Kucera, Jaromir; Chladek, Otokar; Voda, Gustav; Novacek, Jindrich; and Kollmann, Jan, 4,041,733, Cl. 66-138.000.
November, Milton H., to International Telephone and Telegraph Corporation. Densitometer. 4,041,769, Cl. 73-32.00A.
Novo Industri A/S: *See—*
Diers, Ivan Verner, 4,042,460, Cl. 195-65.000.
Noz, Francis X. Apparatus for selectively applying a metal coating to the metallic parts of elements which pass through an insulator. 4,042,480, Cl. 204-224.00R.
Nozdrovsky, Andrei Stepanovich. Bowl centrifuge rotor. 4,042,172, Cl. 233-7.000.
Nuclear Battery Corporation: *See—*
Kruger, Owen Lee, 4,042,670, Cl. 423-251.000.
Nuclear Services Corporation: *See—*
Rubinstein, Herbert J.; Gordon, Clark B.; Robison, Albert; and Clark, Philip M., 4,042,828, Cl. 250-507.000.
Nuovo Pignone, S.p.A.: *See—*
Vinciguerra, Costantino, 4,042,271, Cl. 294-61.000.
Nurnberg, Richard K.; and Perkins, Charles H., to Robertshaw Controls Company. Motor protection circuit. 4,042,964, Cl. 361-28.000.
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Nusz, Thomas R.: *See—*
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Nutter, Jack W. Map vending machine. 4,042,146, Cl. 221-152.000.
Nychka, Henry R.; Eibeck, Richard E.; and Li, Chien C., to Allied Chemical Corporation. Methods for absorption heating. 4,042,524, Cl. 252-69.000.
Nylund, Kare Jorgen. Device for tire chains. 4,042,000, Cl. 152-213.00A.
Nyswander, Reuben E., to United States of America, Navy. Short pulse solid state-magnetic modulator for magnetron transmitter. 4,042,837, Cl. 307-265.000.
O.M. Scott & Sons Company, The: *See—*
Fersch, Kenneth Eugene; and Stearns, Wayne Eugene, 4,042,366, Cl. 71-29.000.
Oakdale Knitting Company: *See—*
Holder, Otis W., 4,041,735, Cl. 66-133.000.
Oba, Hiroshi: *See—*
Fukutani, Hideo; Oba, Hiroshi; Okada, Akane; and Shimizu, Atsuko, 4,042,391, Cl. 96-47.000.
O'Callaghan, James S., to Tram/Diamond Corporation. Radio mounting bracket. 4,042,201, Cl. 248-309.00R.
Ochi, Sam S.: *See—*
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O'Connor, Matthew J.: *See—*
Bennett, Robert P.; O'Connor, Matthew J.; Kober, Alfred E.; and Kukin, Ira, 4,042,348, Cl. 55-5.000.
Oda, Kiyoshi, to Yoshida Kogyo K.K. Automatic lock slider for slide fasteners. 4,041,578, Cl. 24-205.14R.
Oddo, Nicola: *See—*
Marconi, Walter; Oddo, Nicola; and Degen, Ludwig, 4,042,495, Cl. 210-11.000.
O'Doherty, George O. P., to Eli Lilly and Company. 1H-imidazol(4,5-b)pyridine derivatives. 4,042,593, Cl. 260-294.80C.
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Offeringa, Jan, to Shell Oil Company. Carbon-dioxide-assisted production from extensively fractured reservoirs. 4,042,029, Cl. 166-272.000.
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Dorey, Jacques A., 4,042,929, Cl. 343-113.0DE.
Officine Savio, S.p.A.: *See—*
D'Agnolo, Armando; and Minto, Luigi, 4,042,098, Cl. 198-393.000.
Offterdinger, Hermann Freidrich. Linear motion devices. 4,041,786, Cl. 74-29.000.
Ogawa, Masanobu, to Nippon Kayaku Kabushiki Kaisha. Method of manufacturing methacrylic acid and an oxidation catalyst. 4,042,623, Cl. 260-530.00N.
Ohara, Yuichi, to Kabushiki Kaisha Daini Seikosha. System for detecting information in an artificial cardiac pacemaker. 4,041,954, Cl. 128-419.0PT.
Ohashi, Nobuo; Konishi, Motoyuki; Nishida, Minoru; and Inokuchi, Yukio, to Kawasaki Steel Corporation. Process of pretreating cold-rolled steel sheet for annealing. 4,042,425, Cl. 148-13.100.
Ohashi, Tamaki, to Nihon Technical Kabushiki Kaisha. Actuator for push button tuner. 4,041,784, Cl. 74-10.330.
Ohaus Scale Corporation: *See—*
Myers, Earl D., 4,042,050, Cl. 177-198.000.
Ohira, Takeshi; and Watanabe, Akinori, to Hitachi, Ltd. AC Elevator control system. 4,042,069, Cl. 187-29.00R.
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Kojima, Shigeru; Kojima, Kiyoshi; Ohtani, Tadao; Kato, Nobuyuki; Sakamoto, Yoichi; Konno, Isago; Tsukahara, Masaharu; and Kubo, Takao, 4,042,429, Cl. 148-31.550.
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Okada, Akane: *See—*
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Okai, Sakuo; and Kimoto, Koichi, to Napp Systems. Photosensitive compositions. 4,042,386, Cl. 96-35.100.
Okamoto, Takamitsu, to Toyota Jidosha Kogyo Kabushiki Kaisha. Manifold reactor. 4,041,700, Cl. 60-278.000.
Okamoto, Yasushi: *See—*
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Ernst, Horst M.; Brandenstein, Manfred; and Olschewski, Armin, 4,042,086, Cl. 192-98.000.
Olson, John E., to Cascade Corporation. Telescopic ram. 4,041,839, Cl. 91-189.00R.
Olson, Richard S., deceased; and Qualley, John E., executor. Apparatus for protection and storage of phototypesetting equipment. 4,042,286, Cl. 312-129.000.
Olympus Optical Co., Inc.: *See—*
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Ono, Hiromitsu: *See—*
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Osaka Welding Industrial Co., Ltd.: *See—*
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Osborne, William Steese: *See*—
Birney, Richard Eugene; Davis, Michael Ian; Graybiel, Lynn Allan; Hood, Robert Allen; Kahn, Samuel; and Osborne, William Steese, 4,042,913, Cl. 364-200.000.
Ostapchenko, George Joseph; and Phillips, Terrance Duane, to Du Pont de Nemours, E. I., and Company. Process for the automatic inspection of blow-molded articles. 4,042,657, Cl. 264-40.100.
Osterhaus, Elmer J.: *See*—
Wenger, La Von G.; Osterhaus, Elmer J.; and Smith, Oak B., 4,042,715, Cl. 426-104.000.
Ostrander, William M.; and Casper, William J., to Westinghouse Electric Corporation. Elevator system. 4,042,068, Cl. 187-29.00R.
Ostrowski, Richard C.: *See*—
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Otani, Masato: *See*—
Matsuzawa, Hideo; Otani, Masato; Ishii, Hiromichi; Yamada, Kantaro; and Kobayashi, Hasao, 4,042,625, Cl. 260-530.00N.
Otani, Shoichi. Process for preparing a pole piece for the rotor of a generator. 4,041,754, Cl. 72-356.000.
Otomo, Yoshiro: *See*—
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Boyle, James Alfred; Galins, Peteris Adams; Gregoire, Mark Charles; and O'Toole, Peter L. M., 4,042,197, Cl. 244-183.000.
Ottermill Limited: *See*—
Coleman, Edward, 4,042,894, Cl. 335-9.000.
Ottmann, Norman; and Strever, Walter, to Atlantic Pipe Corporation. Apparatus for making concrete pipe. 4,042,315, Cl. 425-392.000.
Otto Bilz Werkzeugfabrik: *See*—
Bilz, Reiner, 4,041,729, Cl. 64-29.000.
Otto Niederer Sons, Inc.: *See*—
Morrone, Ross, 4,042,100, Cl. 198-446.000.
Outboard Marine Corporation: *See*—
Betts, Edmund Douglas, 4,042,312, Cl. 418-121.000.
Blanchard, Clarence E., 4,041,889, Cl. 115-18.00R.
Kidd, Earl H., 4,041,682, Cl. 56-320.200.
Overall, Bob Eugene, to Margaret Mae Cooke. Universal mount for splicing tool. 4,042,200, Cl. 248-223.100.
Overton, Harold C.; and Page, Theodore L., to Republic Steel Corporation. Coating thickness and distribution control. 4,041,895, Cl. 118-7.000.
Owens-Corning Fiberglas Corporation: *See*—
Kane, John L.; and Machlan, George R., 4,042,360, Cl. 65-11.00W.
Owens-Illinois, Inc.: *See*—
Gordon, Theodore H.; and Kummerle, Herman Fred, 4,042,639, Cl. 260-656.00R.
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Oxenenko, Anatoly Yakovlevich: *See*—
Mischenko, Vladimir Petrovich; Oxenenko, Anatoly Yakovlevich; Mischenko, Vladimir Alexandrovich; Vasiliev, Georgy Konstantinovich; Gavrilenko, Jury Alexandrovich; Povelitsa, Vladimir Vasilievich; and Kosenko, Ivan Vasilievich, 4,041,843, Cl. 91-499.000.
Oxy Metal Industries Corporation: *See*—
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Oy. Suomen Vanutehdas - Finnwad Ltd.: *See*—
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Oya, Akiyoshi, to Nippon Gakki Seizo Kabushiki Kaisha. Electronic musical instrument. 4,041,826, Cl. 84-1.010.
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Ozawa, Hiroshi: *See*—
Hirota, Kuniomi; Masumoto, Akio; Ozawa, Hiroshi; Kobayashi, Nobuki; and Honda, Teruo, 4,042,645, Cl. 260-830.00P.
Ozawa, Masahiro; Komatsu, Tadaaki; and Matsuoka, Kimiaki, to Central Glass Co., Ltd. Process for preparing oligomers of hexafluoropropene. 4,042,638, Cl. 260-653.10R.
Pace, Herbert D.: *See*—
Mullen, James W.; McReynolds, Boone K.; and Pace, Herbert D., 4,041,863, Cl. 101-269.000.
Pace, W. David, to Motorola, Inc. Frequency doubler circuit. 4,042,834, Cl. 307-220.00R.
Pacesetter Systems Inc.: *See*—
Kelly, Frank L.; and Tan, Jozef I. Kie Sioe, 4,041,955, Cl. 128-419.00P.
Padgett, Clarence W.: *See*—
Street, Dana C.; and Padgett, Clarence W., 4,042,838, Cl. 307-270.000.
Pagava, Dali Georgievna: *See*—
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Page, Theodore L.: *See*—
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Pakenham, William Edward; and Davis, Leonard Mayor, to General Electric Company Limited, The. Telephone subscriber's apparatus for signalling decimal digit values represented in printed form. 4,042,792, Cl. 179-90.00R.
Pako Corporation: *See*—
Caulfield, Patrick J.; Diesch, Robert E.; and Strunc, Gerald R., 4,042,973, Cl. 235-150.300.
Saarinen, Heimo Unto August, 4,042,474, Cl. 204-112.000.
Palm, John W., to Amoco Production Company. Apparatus for using reheat gas in sulfur recovery systems. 4,042,340, Cl. 23-262.000.
Palmer, Thomas Y.; and Auvil, Clifford J., to United States of America, Agriculture. Environmentally-resistant anemometer. 4,041,759, Cl. 73-231.00R.
Papenfuhs, Theodor, to Hoechst Aktiengesellschaft. Mixtures of disazomethine and monoazo methine compounds, process for their preparation and their use as pigments. 4,042,582, Cl. 106-288.00Q.
Papenfuhs, Theodor; and Volk, Heinrich, to Hoechst Aktiengesellschaft. Water-in-soluble disazo methine compounds. 4,042,611, Cl. 260-439.00R.
Paper Converting Machine Company: *See*—
Spencer, Harvey J., 4,041,813, Cl. 83-14.000.
Papst-Motoren KG: *See*—
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Parent, Guy, to Compagnie Industrielle des Telecommunications Cit-Alcatel. Device for forming channels using detectors spaced out on a circular base. 4,042,930, Cl. 343-113.00R.
Pari, Vincent Anthony, to Universal Bleacher Company. Telescoping seating systems. 4,041,655, Cl. 52-9.000.
Parizek, Josef: *See*—
Resch, Josef; Kadlec, Miloslav; Zahradnik, Stanislav; and Parizek, Josef, 4,041,986, Cl. 139-58.000.
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Partyka, Doris Phyliss: *See*—
Flam, Eric; and Partyka, Doris Phyliss, 4,041,948, Cl. 128-285.000.
Pascale, John V.: *See*—
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Pascaud, Xavier: *See*—
Beregi, Laszlo; Hugon, Pierre; Pascaud, Xavier; and Poignant, Jean-Claude, 4,042,598, Cl. 260-326.100.
Pascetta, Armand N. Keyboard assignment system for a polyphonic electronic musical instrument. 4,041,825, Cl. 84-1.010.
Paszthory, Emmerich; Hille, Ernst; Seifert, Karl-Gerhard; and Zimmermann, Vincenz, to Hoechst Aktiengesellschaft. Process for the preparation of N-acetoacetyl-2,5-dimethoxy-4-chloroanilide. 4,042,622, Cl. 260-562.00K.
Patentes Talgo, S.A.: *See*—
Toran, Angel, 4,041,878, Cl. 105-164.000.
Patty, Richard L. Illuminated sign and high intensity warning device. 4,042,919, Cl. 340-321.000.
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Paul, William A. Docking apparatus for boats. 4,041,887, Cl. 114-230.000.
Paul, William T., to Incom International Inc. Roller chain connecting link spring clip. 4,041,790, Cl. 74-258.000.
Payer, Wolfgang; Riepe, Volker; and Zoller, Wilhelm, to Ruhrchemie Aktiengesellschaft. Process for polymerization of ethylene. 4,042,767, Cl. 526-64.000.
Payne, William J., to Modulus Corporation. Strain indicator. 4,041,776, Cl. 73-88.00F.
Peacock, Frank Raymond: *See*—
Molinski, Victor Joseph; and Peacock, Frank Raymond, 4,042,676, Cl. 424-1.000.
Pearson, Paul W. Pollution control device. 4,042,355, Cl. 55-319.000.
Pech, David J.: *See*—
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Pegoud, Joseph: *See*—
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Peng, Stephen Chung-Suen, to Ford Motor Company. Method of preparing homogeneous thermosetting powder paint compositions. 4,042,560, Cl. 260-42.280.
Pennsylvania Pacific Corporation: *See*—
Smith, Rush B., 4,042,111, Cl. 206-508.000.
Pennwalt Corporation: *See*—
Sheppard, Chester S.; and MacLeay, Ronald E., 4,042,773, Cl. 526-208.000.
Perciful, Jerry C., to Texaco Inc. Thermal cracking wax to normal alpha-olefins. 4,042,488, Cl. 208-102.000.
Perez, Artemio R. Vehicular dual tire obstruction detector. 4,042,909, Cl. 340-52.00R.
Perkins, Charles H.: *See*—
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Pernsteiner, Harold R.; and Streckert, Ernest H. Vehicle wheel-removing and handling device. 4,042,139, Cl. 214-331.000.
Perrotti, Emilio; and Clerici, Mario, to Snam Progetti S.p.A. σ and π organic complexes of transition metals and process for the preparation thereof. 4,042,609, Cl. 260-429.00R.
Perrotti, Emilio: *See*—
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Perry, Elijah R.; and Rabinowitz, Mario, to Electric Power Research Institute. Heat pump system with improved heat transfer. 4,042,012, Cl. 165-1.000.
Perry, Francis James; and Vesci, Anthony, to International Business Machines Corporation. Ink supply for pressurized ink jet. 4,042,937, Cl. 346-1.000.

Personal Communications, Inc.: *See*—
Yevick, George J., 4,042,389, Cl. 96-27.00R.
Perucchi, Norberto: *See*—
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Peters, Clifford M., to ACF Industries, Incorporated. Quick bleed exhaust valve. 4,041,970, Cl. 137-102.000.
Petersen, Arne G. Separator system. 4,041,569, Cl. 15-353.000.
Petersen, Walter Adrian; and Forbes Jones, Robin Mackay, to International Nickel Company, Inc., The. Wrought filler metal for welding highly-castable, oxidation resistant, nickel-containing alloys. 4,042,383, Cl. 75-171.000.
Peterson, Roger W.; and Kordes, Arthur W., to Fasttest Company. Multi-conductor cable testing system with track-mounted sockets for accommodating the cable connectors. 4,042,878, Cl. 324-51.000.
Peterson, Russell K.: *See*—
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Petrochemicals Company, Inc.: *See*—
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Petrolite Corporation: *See*—
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Acheson, Richard M.; Stubbs, John K.; Baxter, Charles A. R.; and Kuhla, Donald E., 4,042,583, Cl. 542-458.000.
Torres, Anibal, 4,042,714, Cl. 426-62.000.
Pfleger, Frederick W. Method and apparatus for automatically sampling material in pre-programmed positions. 4,041,763, Cl. 73-423.00A.
Phillips, Courtenay Stanley Goss, to National Research Development Corporation. Methods and applications of preparative scale chromatography. 4,042,350, Cl. 55-28.000.
Phillips Petroleum Company: *See*—
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Platt, Louis; Wishman, Marvin; Gentry, David R.; and Williams, Jake E., 4,042,655, Cl. 264-25.000.
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Schneider, Julius E., 4,042,011, Cl. 165-1.000.
Phillips, Terrance Duane: *See*—
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Piazza, Giacomo J.: *See*—
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Picker Corporation: *See*—
Brunnett, Carl J.; and Gerth, Vernon W., Jr., 4,042,811, Cl. 235-151.300.
Pier, Jerome R., to Westinghouse Air Brake Company. Manual control of third rail power knockout. 4,042,081, Cl. 191-8.000.
Pierce, Richard H. Method of imparting color to fires. 4,042,313, Cl. 431-4.000.
Pike, Leslie Clark: *See*—
Creasey, Norman Geoffrey; and Pike, Leslie Clark, 4,042,643, Cl. 428-447.000.
Pilot Research Corporation: *See*—
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Pitts, Robert W., Jr.; and Whatley, Houston A., Jr., to Texaco Inc. Dual spectra well logging system and method. 4,042,824, Cl. 250-263.000.
Pittsburgh-Des Moines Steel Company: *See*—
Terlesky, John; Muller, Hugh Emil; Murphy, John C.; and Honath, Harold F., 4,041,722, Cl. 62-45.000.
Pivard, Claude: *See*—
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Plank, Don A.: *See*—
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Platt, Louis; Wishman, Marvin; Gentry, David R.; and Williams, Jake E., to Phillips Petroleum Company. Method for the production of a nonwoven fabric. 4,042,655, Cl. 264-25.000.
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Sterling, Walter S., 4,042,099, Cl. 198-393.000.
Pohl, Gerhard: *See*—
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Poignant, Jean-Claude: *See*—
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Polichette, Joseph; Leech, Edward J.; and Branigan, John G., to Kollmorgen Technologies Corporation. Process for the activation of resinous bodies for adherent metallization. 4,042,729, Cl. 427-304.000.
Polizzano, Anita, executrix: *See*—
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Pollinger, Hans, to Knorr-Bremse GmbH. Wheel and axle assembly for railway vehicles having disc brakes. 4,042,071, Cl. 188-18.00A.
Polster, Rudolf: *See*—
Pommer, Ernst-Heinrich; Polster, Rudolf; and Loecher, Friedrich, 4,042,686, Cl. 424-164.000.
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Porazinski, Robert F.: *See*—
Gawin, Adolph J.; and Porazinski, Robert F., 4,042,299, Cl. 355-40.000.
Poskitt, Ralph Leroy, to Du Pont de Nemours, E. I., and Company. Process for the preparation of a storage stable mastic adhesive. 4,042,554, Cl. 260-29.7NR.
Pounds, Walter R., to KB-Denver, Inc. Method of making keyboard assemblies. 4,042,439, Cl. 156-292.000.
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Mischenko, Vladimir Petrovich; Oxenenko, Anatoly Yakovlevich; Mischenko, Vladimir Alexandrovich; Vasiliev, Georgy Konstantinovich; Gavrilenko, Jury Alexandrovich; Povelitsa, Vladimir Vasilievich; and Kosenko, Ivan Vasilievich, 4,041,843, Cl. 91-499.000.
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Seifert, Lester H.; Powers, Raymond P.; Schmidt, William M.; Thorwaldsen, Stanley E.; and Smith, Frederick W., 4,041,679, Cl. 56-11.300.
Powers, William James, Jr.: *See*—
Hart, Marvin Sumner; and Powers, William James, Jr., 4,041,583, Cl. 28-254.000.
PPG Industries, Inc.: *See*—
Mazzoni, Renato J., 4,041,663, Cl. 52-203.000.
Practical Systems, Inc.: *See*—
Stewart, Robert H., 4,041,649, Cl. 51-165.740.
Prager, Charles H.; and Seller, John J. Animal grooming apparatus having improved tethering device. 4,041,905, Cl. 119-103.000.
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Verwey, William G. A.; and Stanton, Stephen, 4,041,853, Cl. 100-4.000.
Preis, Lothar: *See*—
von Bonin, Wulf; Preis, Lothar; von Gizycki, Ulrich; and Dahm, Manfred, 4,042,558, Cl. 260-37.0ON.
Presby, Herman Melvin, to Bell Telephone Laboratories, Incorporated. Method for monitoring the properties of plastic coatings on optical fibers. 4,042,723, Cl. 427-8.000.
Price, William Louis, to Advanced Micro Devices, Inc. Platinum silicide fuse links for integrated circuit devices. 4,042,950, Cl. 357-51.000.
Prince, Jack A.: *See*—
Beck, Nicholas Robert; Leonard, Gordon C.; and Prince, Jack A., 4,042,176, Cl. 241-24.000.
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Mueller, Paul; and Prine, Ray A., 4,041,726, Cl. 62-238.000.
Procter, Donald: *See*—
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Sanford, Lawrence H., 4,041,951, Cl. 128-287.000.
Produits Chimiques Ugine Kuhlmann: *See*—
Arsac, Aime Joseph; and Frank, Pierre, 4,042,579, Cl. 260-178.000.
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Gustafsson, Berth Ulrik, 4,041,724, Cl. 62-175.000.
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Breton, Ernest J.; Worden, Dexter; and Pugh, Melville E., Jr., 4,042,747, Cl. 428-323.000.
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Kraft, Francis J.; and Puhak, Peter G., 4,042,961, Cl. 358-248.000.
Pullman Incorporated: *See*—
Glassmeyer, John J.; and Hughes, Howard W., 4,042,275, Cl. 296-43.000.

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Pusch, Gunter; Klatt, Heinz Jurgen; and Frohlich, Walter, to Deutsche Texaco Aktiengesellschaft. Method for initiating an in-situ recovery process by the introduction of oxygen. 4,042,026, Cl. 166-258.000.

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Muhler, Joseph C.; Putt, Mark S.; Kleber, Carl J.; and Yoho, Clayton W., 4,042,680, Cl. 424-55.000.

Puttlitz, Frederic John: *See—*
Bourke, Donall Garraid; and Puttlitz, Frederic John, 4,042,911, Cl. 364-900.000.

Q-Bit Corporation: *See—*
Mead, Hansel B.; and Callaway, Gary R., 4,042,887, Cl. 330-53.000.

Qualley, John E., executor: *See—*
Olson, Richard S., deceased; and Qualley, John E., executor, 4,042,286, Cl. 312-129.000.

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Holm, Peter H.; and Quartz, William L., 4,042,398, Cl. 96-85.000.

Querry, Lester R., to Rixon, Inc. Phase demodulator with offset frequency reference oscillator. 4,042,884, Cl. 329-122.000.

Quinn, H.; and Soures, Nicholas M., to Xerox Corporation. High-voltage a.c. power supply with automatically variable d.c. bias current. 4,042,874, Cl. 323-4.000.

Rabe, Peter, to Rowenta-Werke, GmbH. Gas lighter burner. 4,042,316, Cl. 431-344.000.

Rabinowitz, Mario: *See—*
Perry, Elijah R.; and Rabinowitz, Mario, 4,042,012, Cl. 165-1.000.

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Hassan, Javathu Kutikaran; and Rabstejnek, Carl Vincent, 4,042,119, Cl. 214-1.0CM.

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Davis, John W., 4,042,934, Cl. 343-786.000.

Radlmann, Eduard: *See—*
Bernert, Claus-Rudiger; Radlmann, Eduard; and Nischk, Gunther, 4,042,570, Cl. 260-75.00M.

Rae, James Wilson, to Motorola, Inc. Automatic noise limiter. 4,042,883, Cl. 325-477.000.

Raether, Wolfgang: *See—*
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Raimondi, Victor V.; Fox, Roy A.; and Piorkowski, Casey E., to Standard Oil Company (Indiana). Binder composition for adhesives and sealants. 4,042,555, Cl. 260-29.6RB.

Rain, Lloyd H., to Irvin Industries, Inc. Stress relieved air supported structure. 4,041,653, Cl. 52-2.000.

Rainer, Georg, to Byk Gulden Lomberg Chemische Fabrik GmbH. Halogen pyrazole derivatives, a method for producing these halogen pyrazole derivatives, medicaments containing and methods of using them. 4,042,702, Cl. 424-273.00P.

Rajakovics, Gundolf E., to Vereinigte Edelstahlwerke Aktiengesellschaft. Thermal power plants and method of operating a thermal power plant. 4,041,709, Cl. 60-655.000.

Ram Industries, Inc.: *See—*
Grover, Ross D., 4,041,996, Cl. 144-2.00N.

Ramelot, Daniel Leon, to Centre de Recherches Metallurgiques-Centrum voor Research in de Metallurgie. Controlling pig iron refining. 4,042,378, Cl. 75-60.000.

Ramstad, Tore; Mahle, Nels H.; and Matalon, Ralph, to Dow Chemical Company, The. Liquid adsorption chromatographic apparatus and method. 4,042,499, Cl. 210-31.00C.

Ranco Incorporated: *See—*
Demaray, Merlin E.; and Attridge, Russell G., Jr., 4,042,013, Cl. 165-2.000.

Rarey, Kenneth W.; Higgins, Edward D.; Hungerford, Donald L.; and Kennedy, John B., Jr., to Continental Can Co., Inc. Apparatus for electrostatic printing or coating and developer mix circulating system. 4,041,901, Cl. 118-621.000.

Rasinski, Edward, to Moorhead Machinery & Boiler Co. Super heater. 4,041,908, Cl. 122-479.00R.

Rasmussen, Don H.; and Loper, Carl R., Jr., to Wisconsin Alumni Research Foundation. Micron sized spherical droplets of metals and method. 4,042,374, Cl. 75-.50B.

Rauenhorst, Gerald A. Hollow-core concrete slabs. 4,041,669, Cl. 52-576.000.

Rauschelbach, Paul Allen: *See—*
Schaffer, Richard Earl; and Rauschelbach, Paul Allen, 4,042,867, Cl. 318-580.000.

Rawlings, Robert M.; and Procter, Donald, to Commonwealth Scientific and Industrial Research Organization. Method for manufacturing ruminant feed supplements comprising a protein-aldehyde complex. 4,042,718, Cl. 426-573.000.

Rayle, Roy E.; Brey, Robert J.; and Woodruff, Wilbur John, to Amron Corporation. Thin walled steel cartridge case. 4,041,868, Cl. 102-43.00F.

Raymond Lee Organization, Inc., The: *See—*
Bickford, Edgar P., 4,042,803, Cl. 219-211.000.
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Raytheon Company: *See—*
Gustafsson, Sven G., 4,042,931, Cl. 343-117.00R.

Razdan, Raj Kumar: *See—*
Harris, Louis Selig; Pars, Harry George; Sheehan, John Clark; and Razdan, Raj Kumar, 4,042,694, Cl. 424-248.550.

Razim, Claus; Lovasz, Csaba; and Baier, Kurt, to Daimler-Benz Aktiengesellschaft. Process for controlling fused salt nitridation of metals with a solid electrolyte electrode. 4,042,427, Cl. 148-15.500.

RCA Corporation: *See—*
Feldstein, Nathan, 4,042,382, Cl. 75-170.000.
Hanak, Joseph John; Friel, Ronald Norman; and Goodman, Lawrence Alan, 4,042,293, Cl. 350-160.0LC.
Hills, Vernon Elton; and Wu, Leesui, 4,042,841, Cl. 307-272.000.
McNamee, James Arthur, 4,041,775, Cl. 73-70.200.

Reade, Richard F., to Corning Glass Works. Thermally stable glass-ceramic articles. 4,042,403, Cl. 106-39.700.

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Kellenbenz, Carl W.; Goodman, James P.; and Rector, Randall C., 4,042,830, Cl. 307-40.000.

Redmore, Derck; and Woodson, Alfred E., to Petrolite Corporation. Process of inhibiting corrosion of metal in an aqueous environment with mixtures of thio-, oxygen and thio- oxygen phosphates and pyrophosphates. 4,042,323, Cl. 21-2.70A.

Reed, John A., to National Semiconductor Corporation. MOS dynamic random access memory having an improved address decoder circuit. 4,042,915, Cl. 340-173.00R.

Reeves, Adam A.: *See—*
Jones, John B., Jr.; and Reeves, Adam A., 4,042,485, Cl. 208-11.00R.

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Reichenberger, Helmut, to Siemens Aktiengesellschaft. Electrode for polarographic measurements in physiological media. 4,041,933, Cl. 128-2.00E.

Reichert, Donald G., to ABC Packaging Machine Corporation. Method of erecting carton blanks. 4,041,850, Cl. 93-53.00M.

Reichow, Keith W.; English, David C.; and McCauley, Jerry L., to Structural Instrumentation, Inc. Vehicle load measuring system. 4,042,049, Cl. 177-137.000.

Reid, Laurie M., to Anderson Bros. Mfg. Co. Apparatus for packing articles, such as bottles. 4,041,674, Cl. 53-61.000.

Reid, Laurie M., to Anderson Bros. Mfg. Co. Packaging apparatus. 4,041,677, Cl. 53-159.000.

Reiff, Helmut: *See—*
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Reitz, Norman E., to Sotec Corporation. Crystallizing a layer of silicon on a sodium thallium type crystalline alloy substrate. 4,042,447, Cl. 156-610.000.

Rekoff, Michael George, Jr., to Teledyne Brown Engineering. Mechanism for converting rotary motion into precise low speed linear motion. 4,041,795, Cl. 74-424.80B.

Remy, David C., to Merck & Co., Inc. Ethynylaryl phenyl cyclopropyl thiazines and morpholines. 4,042,584, Cl. 544-59.000.

Renard, Pierre: *See—*
Laforest, Jean; Silhol, Louis; and Renard, Pierre, 4,042,620, Cl. 260-518.00R.

Rendel, Klaus-Jurgen: *See—*
Langhammer, Hans Jurgen; Abratis, Horst; Schafer, Klaus; Rendel, Klaus-Jurgen; and Lotze, Horst, 4,042,223, Cl. 266-47.000.

Rengo Kabushiki Kaisha: *See—*
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Repay, Laszlo N.; and Young, Thomas A., to Tenna Corporation. Electrically adjustable vehicle accessory. 4,041,793, Cl. 74-424.80R.

Republic Steel Corporation: *See—*
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Thomas, Jerry D.; Hladio, William F.; and Scott, Leo V., 4,042,381, Cl. 75-129.000.
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Resch, Josef; Kadlec, Miloslav; Zahradnik, Stanislav; and Parizek, Josef, to Elitex Koncern textilniho strojirenstvi. Device for forming a shed in a weaving machine. 4,041,986, Cl. 139-58.000.

Research Corporation: *See—*
Goering, Kenneth Justin; and Eslick, Robert Freeman, 4,042,414, Cl. 127-32.000.
McCorkle, Richard A.; and Joyce, James M., 4,042,827, Cl. 250-493.000.

Research Products Corporation: *See—*
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Reuschel, Konrad: *See—*
Haas, Ernst; Martin, Joachim; Reuschel, Konrad; and Schnoeller, Manfred, 4,042,454, Cl. 176-10.000.

Reuting, Hans Werner, to ELMEG Elektro-Mechanik GmbH. Damping of contacts. 4,042,799, Cl. 200-288.000.

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Bruning, Klaus; Junger, Hans; Pungs, Wolfgang; Rheinfeld, Peter; Weissenfels, Franz; and Wienand, Michael, 4,042,314, Cl. 425-89.000.
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Rhodes, Charles F., Jr., to Sun Oil Company. Zeroing circuit. 4,042,885, Cl. 330-9.000.
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Rhodes, Philip H.: *See*—
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Rhodes, William A. Vacuum cleaner. 4,041,568, Cl. 15-344.000.
Rhodes, William A. Body fluid transfusion and displacement apparatus and method. 4,041,944, Cl. 128-214.00B.
Rhone-Poulenc, S.A.: *See*—
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Rhone-Progil: *See*—
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Ricciardi, Ronald J. Flexibly mounted container system. 4,042,051, Cl. 177-255.000.
Rice, Donald D.; and Walton, Herbert H., to Fisher Controls Company. Quick change valve trim assembly. 4,041,973, Cl. 137-315.000.
Rice, Herbert L.; and Wilkins, Roy A., to Petrochemicals Company, Inc. Method of treating phosphate-containing material to reduce problem with clay swelling. 4,042,666, Cl. 423-167.000.
Rice, James S.: *See*—
Eickelberg, John E.; and Rice, James S., 4,042,869, Cl. 318-630.000.
Richards, Frank P., to Phillips Petroleum Company. Method of making container. 4,041,848, Cl. 93-36.50R.
Richards, Glenn L., to Stromberg-Carlson Corporation. Output processing and output coupling circuit for a digital tone receiver. 4,042,787, Cl. 179-84.0VF.
Richards, Glenn L., to Stromberg-Carlson Corporation. Tone detector. 4,042,788, Cl. 179-84.0VF.
Richards, Glenn L., to Stromberg-Carlson Corporation. Tone combination detector and coincidence timer circuit. 4,042,789, Cl. 179-84.0VF.
Richards, Glenn L., to Stromberg-Carlson Corporation. Voice guard circuit for a tone receiver. 4,042,790, Cl. 179-84.0VF.
Richards, Michael S., to Shawn Products Company. Yarn package support bearing. 4,042,188, Cl. 242-129.510.
Richardson, Warner G.: *See*—
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Richmond Manufacturing Company, The: *See*—
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Capoccia, Anastasio, 4,042,046, Cl. 175-73.000.
Riebel, Hans-Jochem: *See*—
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Rietsch, Eike, to Deutsche Texaco Aktiengesellschaft. Method of seismic exploration. 4,042,910, Cl. 340-15.5TA.
Rigo, Gualtiero; and Manghi, Carlo Alberto, to Societa Italiana Telecommunicazioni SIEMENS S.p.A. Marker for telecommunication system. 4,042,785, Cl. 179-18.0FC.
Riloga-Werk Julius Schmidt: *See*—
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Ringler, Robin L., to Aluminum Plumbing Fixture Corporation. Toilet flushing device with overflow inhibitor. 4,041,557, Cl. 4-75.000.
Rinio, Johannes Augustus. Cable hauling apparatus. 4,042,212, Cl. 254-164.000.
Ripka, William Charles, to Du Pont de Nemours, E. I., and Company. 3α-Arylhydroisoindoles. 4,042,707, Cl. 424-274.000.
Risch, Douglas M. Tuning aids. 4,041,832, Cl. 84-454.000.
Risse, Jean-Claude, to J. Bobst & Fils S.A. Device for receiving a tape of material. 4,042,185, Cl. 242-71.700.
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Ristagno, Charles V., to Micro-Display Systems, Inc. Illuminated electro-optical display apparatus. 4,042,294, Cl. 350-60LC.
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Rivere, Jean-Pierre, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Fuel injection system. 4,041,918, Cl. 123-139.0AW.
Rivier, Georges: *See*—
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Roark, Thomas J. Mechanical drive system for a remote area. 4,041,785, Cl. 74-11.000.
Robar Mini-Gym, Inc.: *See*—
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Robertshaw Controls Company: *See*—
Bechtel, Jon H., 4,042,901, Cl. 338-28.000.
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Nurnberg, Richard K.; and Perkins, Charles H., 4,042,964, Cl. 361-28.000.
Robertson, Donald Edwin; Urry, Wilbert Herbert; and Kavka, Frank, to IMC Chemical Group, Inc. Synthesis of dideoxyzearalane and related compounds. 4,042,602, Cl. 260-343.410.
Robeson, Robert Ogden; and Hart, Vincent Joseph. Piano pedal assembly. 4,041,829, Cl. 84-225.000.
Robinet, Norman A. Clothes dryer. 4,041,614, Cl. 34-92.000.
Robinson, Franklin E., to Norton Company. Masonry saw. 4,041,928, Cl. 125-13.0SS.
Robinson, John Thomas; and Edwards, Richard A., to Texas Instruments Incorporated. Gold-germanium alloy contacts for a semiconductor device. 4,042,951, Cl. 357-67.000.
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Rochester, Nathaniel: *See*—
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Morris, Winfred L.; and Thompson, Donald O., 4,041,774, Cl. 73-67.900.
Rhodes, Melvin H., 4,042,868, Cl. 318-615.000.
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Tarakci, Umit, 4,042,387, Cl. 96-36.000.
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Roos, Hans Walter. Water gravity plant feeder. 4,042,150, Cl. 222-70.000.
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Rosaen, Nils O., to Rosaen, Nancy Helen, a part interest. Flow indicator with improved biasing assembly. 4,041,891, Cl. 116-117.00R.
Rosenberg, Jeffrey P. Pool cleaning device. 4,041,965, Cl. 134-167.00R.
Ross, Martin I.; and Rogers, Arthur M., to Exclusive Envelope Corporation. Travel envelope construction having integrally formed elongated baggage identification tags. 4,042,171, Cl. 229-72.000.
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Rowinski, Anthony S. Nail-extracting apparatus. 4,042,209, Cl. 254-21.000.
Rozmus, Walter J., to Kelsey-Hayes Company. Apparatus and method for cold working metal powder. 4,041,742, Cl. 72-38.000.
RP Rorprodukter AB: *See*—
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novna; and Kocheva, Zoya Vasilievna, 4,042,411, Cl. 106-270.000.

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Dougan, Ramon C.; and Rudtke, Helen T., 4,041,942, Cl. 128-132.00D.

Ruediger, Frederick, to Standard Pressed Steel Co. Method of assembling storage system. 4,041,600, Cl. 29-513.000.

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Payer, Wolfgang; Riepe, Volker; and Zoller, Wilhelm, 4,042,767, Cl. 526-64.000.

Rummer, Jurgen. Apparatus for cutting carpet samples. 4,041,818, Cl. 83-256.000.

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Kuettner, Klaus E.; Eisenstein, Reuben; and Sorgente, Nino, 4,042,457, Cl. 195-1.800.

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Russell, Florence P., executrix: *See—*
Stepien, George, Jr.; Califano, Frank L., deceased; DeLorenzo, William, Jr., co-executor; Gillard, G. Bruce, co-executor; Russell, Thomas E., deceased; and Russell, Florence P., executrix, 4,041,712, Cl. 61-36.00R.

Russell, Robert C.: *See—*
Blauvelt, Lon; Dickson, J. Douglas; and Russell, Robert C., 4,042,126, Cl. 214-8.50A.

Russell, Thomas E., deceased: *See—*
Stepien, George, Jr.; Califano, Frank L., deceased; DeLorenzo, William, Jr., co-executor; Gillard, G. Bruce, co-executor; Russell, Thomas E., deceased; and Russell, Florence P., executrix, 4,041,712, Cl. 61-36.00R.

Rut, Tadeusz, to Instytut Obrobki Plastycznej. Method and devices for forging single crank throws of semi-built up crankshafts. 4,041,755, Cl. 72-353.000.

Rutan, Clifford S. Safety device for lawn mowers. 4,042,251, Cl. 280-47.330.

Ruud, Clayton O., to Colorado Seminary. Stressed-unstressed standard for X-ray stress analysis and method of making same. 4,042,825, Cl. 250-272.000.

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Rys, Paul; and Vogelsanger, Rolf, to Ciba-Geigy Corporation. Spiro compounds. 4,042,635, Cl. 260-623.00D.

S&S Corrugated Paper Machinery Co., Inc.: *See—*
Chu, Paul; Weiskopf, Gunther; and Saunders, Lawrence J., 4,041,819, Cl. 83-302.000.

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Saarinen, Heimo Unto August, to Pako Corporation. Separating nickel, cobalt and chromium from iron in metallurgical products. 4,042,474, Cl. 204-112.000.

Sabloewski, Horst; Schurbrock, Klaus; and Solter, Dieter, to Eppendorf Geratebau Netheler & Hinz GmbH. Pipette device. 4,041,764, Cl. 73-425.600.

Sahasrabudhe, Arun P.; and Matty, Thomas C., to Westinghouse Electric Corporation. Signal amplifier apparatus with fail-safe limited gain. 4,042,888, Cl. 330-109.000.

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Saito, Tsuyoshi: *See—*
Asano, Kiro; Tamura, Humio; Saito, Tsuyoshi; and Kawai, Yoshio, 4,042,486, Cl. 208-44.000.

Saito, Yoshiichi: *See—*
Yamazaki, Jun'ichiro; Kamo, Takeshi; and Saito, Yoshiichi, 4,042,479, Cl. 204-192.00F.

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Matsumoto, Seiji; and Fukai, Kiyoshi, 4,042,516, Cl. 252-62.540.

Sakamoto, Eiichi: *See—*
Baba, Shigeji; Okubo, Bunji; and Sakamoto, Eiichi, 4,042,400, Cl. 96-124.000.

Sakamoto, Yoichi: *See—*
Kojima, Shigeru; Kojima, Kiyoshi; Ohtani, Tadao; Kato, Nobuyuki; Sakamoto, Yoichi; Konno, Isago; Tsukahara, Masaharu; and Kubo, Takao, 4,042,429, Cl. 148-31.550.

Sakurai, Seiya. One hand operated umbrella capable of self-opening. 4,041,966, Cl. 135-22.000.

Salmond, William G., to Sandoz, Inc. 2-Alkyl-5-phenethyl-4-oxazolecarboxylic acids and derivatives. 4,042,596, Cl. 260-307.00R.

Salomon, Georges Pierre Joseph, to Establissements Francois Salomon et Fils. Ski binding. 4,042,257, Cl. 280-624.000.

Samokhin, Igor Nikolaevich: *See—*
Chviruk, Vladimir Petrovich; Koneva, Nina Vasilievna; Kilkinov, Alexandr Afanasievich; Demin, Alexandr Viktorovich; Shipkov, Nikolai Nikolaevich; Kosinsky, Konstantin Alexeevich; Kamarian, Georgy Mikirtychevich; Nemirovsky, Ernest Elizarovich; and Samokhin, Igor Nikolaevich, 4,042,656, Cl. 264-29.500.

Sandoz, Inc.: *See—*
Coombs, Robert V., 4,042,704, Cl. 424-273.00P.
Salmond, William G., 4,042,596, Cl. 260-307.00R.

Sandoz Ltd.: *See—*
Groebke, Wolfgang, 4,042,580, Cl. 260-207.000.
Hofer, Kurt; and Tscheulin, Guenther, 4,042,562, Cl. 260-45.8NT.
Hofer, Kurt, Sr.; and Hofer, Kurt, Jr., 4,042,632, Cl. 260-607.0AL.
Kaul, Bansi Lal, 4,042,577, Cl. 260-153.000.
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Trueb, Werner, 4,042,370, Cl. 71-86.000.

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Sanford, Lawrence H., to Procter & Gamble Company, The. Absorptive structure having improved surface dryness and improved resistance to rewetting in-use. 4,041,951, Cl. 128-287.000.

Sankyo Electric Company, Limited: *See—*
Hiraga, Masaharu, 4,042,309, Cl. 417-269.000.

San Miguel, Anthony, to United States of America, Navy. Cook-off liner component. 4,041,869, Cl. 102-56.00R.

Santa Barbara Research Center: *See—*
Buller, J. Stanley, 4,041,968, Cl. 137-74.000.

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Ruspa, Bernardino, 4,041,573, Cl. 19-65.00R.

Santen, Salomon, to Stork Amsterdam B.V. Installation for the treatment of container-packed commodities. 4,042,103, Cl. 198-645.000.

Sanyo Electric Co., Ltd.: *See—*
Yasuoka, Yoshio; Ito, Fumihiko; Tsuboi, Kunitada; Jinno, Kaori; and Yamano, Masaru, 4,042,851, Cl. 315-39.510.

Saoyama, Yoshihito: *See—*
Nomaki, Koji; and Saoyama, Yoshihito, 4,042,725, Cl. 427-57.000.

Sapper, Peter. Shoe. 4,041,619, Cl. 36-25.00R.

Sargent Industries, Inc.: *See—*
Smith, Fred T., 4,042,133, Cl. 214-83.300.
Smith, Fred T., 4,042,134, Cl. 214-83.300.

Sargis, Sargis E. Modular concrete building components for a lightweight structure system. 4,041,666, Cl. 52-405.000.

Sarkisian, Robert. Art frame. 4,041,632, Cl. 40-156.000.

Sasaki, Kenichi: *See—*
Iida, Hiroshi; and Sasaki, Kenichi, 4,041,916, Cl. 123-119.00A.

Sasson, Eli. Apparatus for visually registering indicia. 4,041,628, Cl. 40-111.000.

Sato, Hisayuki: *See—*
Morita, Eiichi; Sato, Hisayuki; and Kobayashi, Toru, 4,042,866, Cl. 318-568.000.

Sato, Ryuichi; Oikawa, Teruo; and Nakata, Masahiro, to Nikkiso Co., Ltd. Stroke length adjusting devices. 4,041,800, Cl. 74-571.00R.

Satou, Kazumi: *See—*
Matsuba, Hironori; and Satou, Kazumi, 4,042,776, Cl. 174-110.00R.

Sauer, John Carl, to Du Pont de Nemours, E. I., and Company. Oxidation of N-substituted methylamines to N-substituted formamides. 4,042,621, Cl. 260-561.00R.

Sauerbier, Heinz: *See—*
Franke, Johannes; Kessler, Kurt; Muller, Wolfgang; Sauerbier, Heinz; Schneider, Kurt; and Unbehaun, Karl, 4,042,318, Cl. 432-210.000.

Saunders, Lawrence J.: *See—*
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Sauter, Robert: *See—*
Griss, Gerhart; Grell, Wolfgang; Hurnaus, Rudolf; Sauter, Robert; Eisele, Bernhard; Kaubisch, Nikolaus; and Leitold, Matyas, 4,042,711, Cl. 424-319.000.

Savage, Robert M. Fishing pole leverage device. 4,041,635, Cl. 43-25.000.

Savins, Joseph George; Burdyn, Ralph F.; and Waite, Jerry M., to Mobil Oil Corporation. Oil recovery by viscous waterflooding. 4,042,030, Cl. 166-273.000.

Sawa, Yoshio, to Kanebo, Ltd. Novel dibenzo[a,g]quinolizinium compounds. 4,042,592, Cl. 260-286.00Q.

Sawluk, Wlodzimierz, to Ernst Winter & Sohn. Material removal tool with multiple cutting edges. 4,041,650, Cl. 51-206.00R.

Sawyer, George M. High density merchandise display and rack. 4,042,095, Cl. 211-49.00D.

Saylor, Richard; and Nagel, Robert H., to IDR, Inc. Row grabbing system. 4,042,958, Cl. 358-141.000.

Scalia, Joseph: *See—*
Henning, George J.; McKinney, Lynn B.; and Scalia, Joseph, 4,042,144, Cl. 220-273.000.

Schaefer, Jan Van Valkenburg. Transistor oscillator power converter. 4,042,870, Cl. 363-2.000.

Schaefer Manufacturing, Inc.: *See—*
Cale, Roland E., 4,042,078, Cl. 188-231.000.

Schaeffer, James Robert: *See—*
Esders, Theodore Walter; Schaeffer, James Robert; and Harris, Harry Wayne, 4,042,461, Cl. 195-66.00R.

Schafer, Klaus: *See—*
Langhammer, Hans Jurgen; Abratis, Horst; Schafer, Klaus; Rendel, Klaus-Jurgen; and Lotze, Horst, 4,042,223, Cl. 266-47.000.

Schaffer, Richard Earl; and Rauschelbach, Paul Allen, to Sperry Rand Corporation. Remote selector for flight instruments. 4,042,867, Cl. 318-580.000.

Schankman, Milton, to Stakmore Co., Inc. Convertible poker table. 4,041,880, Cl. 108-112.000.

Schaub, Andres: *See*—
Becker, Carl; Wegmann, Jacques; and Schaub, Andres, 4,042,320, Cl. 8-39.00C.

Schelp, Helmut R., to Garrett Corporation, The. High temperature gas turbine. 4,041,699, Cl. 60-39.550.

Schering Aktiengesellschaft: *See*—
Ahrens, Hanns; Koch, Henning; Schroder, Eberhard; Biere, Helmut; and Kapp, Joachim-Friedrich, 4,042,706, Cl. 424-273.00P.

Schibbye, Hjalmar; and Englund, Arnold, to Svenska Rotor Maskiner Aktiebolag. Screw compressor control means. 4,042,310, Cl. 417-310.000.

Schibrowski, Jurgen, to Jean Walterscheid GmbH. Broaching device. 4,041,590, Cl. 29-95.100.

Schiff, Daniel: *See*—
Allan, Donald S.; and Schiff, Daniel, 4,041,771, Cl. 73-40.50R.

Schimanski, Freddie G., to Wells Manufacturing Corporation. Machine tool with an automatic tool changer. 4,041,601, Cl. 29-568.000.

Schladitz, Hermann Johannes. Method for the manufacture of a heat exchanger or heat transfer element. 4,042,163, Cl. 228-198.000.

Schlicher, Charles W., to S/V Tool Company, Inc. Combination scraper and brush with extensible handle. 4,041,564, Cl. 15-111.000.

Schlichte, Max: *See*—
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Schlotzhauer, Allan T.: *See*—
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Schlumberger Technology Corporation: *See*—
Trouiller, Jean Claude; and Lafont, Guy, 4,042,907, Cl. 340-15.5BH.

Schmermund, Alfred. Conveying and storing apparatus. 4,042,094, Cl. 198-347.000.

Schmidt, Dietrich; Hofer, Johann; Lang, Winfried; and Bildl, Erich, to Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH. Process for the determination of the boron contents of pure halogensilanes. 4,042,331, Cl. 23-230.0PC.

Schmidt, Hans V. Combination roller conveyor and cross-conveyor system. 4,042,118, Cl. 214-1.0BB.

Schmidt, Joachim; Bamberg, Wolfgang; Grunert, Hartmut; Schorm, Erhard; and Weigelt, Christian, to VEB Jenapharm Jena. Detoxification of cyanides and cyanide-containing solutions. 4,042,502, Cl. 210-59.000.

Schmidt, William M.: *See*—
Seifert, Lester H.; Powers, Raymond P.; Schmidt, William M.; Thorwaldsen, Stanley E.; and Smith, Frederick W., 4,041,679, Cl. 56-11.300.

Schmohe, James S., to Sundstrand Corporation. Low speed disconnect. 4,042,088, Cl. 192-114.00R.

Schnabel, Roland; Holzel, Alexander; and Gotter, Kurt, to Jenaer, Glaswerk, Schott & Gen. Process for production of porous glass membrane tubes. 4,042,359, Cl. 65-2.000.

Schneider, Julius E., to Phillips Petroleum Company. Refrigeration control. 4,042,011, Cl. 165-1.000.

Schneider, Kurt: *See*—
Franke, Johannes; Kessler, Kurt; Muller, Wolfgang; Sauerbier, Heinz; Schneider, Kurt; and Unbehaun, Karl, 4,042,318, Cl. 432-210.000.

Schnoeller, Manfred: *See*—
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Schoeller Technical Papers, Inc.: *See*—
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Schonbrun, David M. Snowshoe. 4,041,622, Cl. 36-124.000.

Schorm, Erhard: *See*—
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Schrewe, Hans: *See*—
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Schroder, Eberhard: *See*—
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Schromm, Kurt: *See*—
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Schultz, Peter C., to Corning Glass Works. Fused P_2O_5 type glasses. 4,042,404, Cl. 106-52.000.

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Schulz, John Carl, to J. I. Case Company. Vehicle clutch control assembly. 4,042,084, Cl. 192-13.00R.

Schulz, Werner: *See*—
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Schulz, Willis Lorenz, to Borg-Warner Corporation. Torque convertor with centrifugal lock up clutch. 4,042,083, Cl. 192-3.310.

Schuplin, Jerome T., to Fastway Fasteners, Inc. Fixture support for grid type ceiling. 4,041,657, Cl. 52-39.000.

Schurbrock, Klaus: *See*—
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Schwabe, Willie Carl. Drilling technique. 4,042,048, Cl. 175-380.000.

Schwan, Thomas J., to Morton-Norwich Products, Inc. Antidepressant 2-[(substituted-1-naphthylmethyl)amino]-1-phenylpropanols. 4,042,624, Cl. 260-570.600.

Schweigert, James R. Bucket attachment for garden tractors. 4,042,141, Cl. 214-766.000.

Science Union et Cie, Societe Francaise de Recherche Medicale: *See*—
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Scott & Fetzer Company, The: *See*—
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Scott, Leo V.: *See*—
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Scott, Lyle Burnell, to BJ-Hughes Inc. Multiple stage cementing of well casing in subsea wells. 4,042,014, Cl. 166-.500.

Scott Paper Company: *See*—
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Scrivener, Francis Edward, Jr.: *See*—
Duncan, Patrick Joseph; and Scrivener, Francis Edward, Jr., 4,041,689, Cl. 57-140.00J.

Scrufari, Pascal. Dual-barrel pistol. 4,041,633, Cl. 42-65.000.

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Leemann, Karl, 4,041,978, Cl. 137-494.000.

Searle, Robert J. G.: *See*—
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Sebenda, Jan: *See*—
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Seguchi, Koji; Sugita, Minoru; Inada, Kazuyoshi; Tagaya, Kiyoshi; and Nakamura, Yuji, to Kureha Kagako Kogyo Kabushiki Kaisha. Method for the treatment of heavy petroleum oil. 4,042,487, Cl. 208-48.00R.

Seidel, Siegfried, to Siemens Aktiengesellschaft. A-C magnet with a shorting ring. 4,042,897, Cl. 335-245.000.

Seidenbusch, Heinz, to Siemens Aktiengesellschaft. Mounting device for compression spring. 4,042,798, Cl. 200-243.000.

Seifert, Karl-Gerhard: *See*—
Paszthory, Emmerich; Hille, Ernst; Seifert, Karl-Gerhard; and Zimmermann, Vincenz, 4,042,622, Cl. 260-562.00K.

Seifert, Lester H.; Powers, Raymond P.; Schmidt, William M.; Thorwaldsen, Stanley E.; and Smith, Frederick W., to Seifert, Lester H. Self-propelled rotary lawn mower. 4,041,679, Cl. 56-11.300.

Selfe, Barry David. Routing apparatus. 4,041,997, Cl. 144-136.00C.

Selfridge, Eugene W.: *See*—
Selfridge, Leroy K., 4,041,605, Cl. 30-293.000.

Selfridge, Leroy K., to Selfridge, Eugene W. Wallpaper trimmer. 4,041,605, Cl. 30-293.000.

Selin, Howard; and Marker, John R., Jr., to Stone Container Corporation. Paperboard carton. 4,042,166, Cl. 229-33.000.

Seller, John J.: *See*—
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Sessions, Douglas Charles, to Motorola, Inc. Solid-state ignition system and method for linearly regulating and dwell time thereof. 4,041,912, Cl. 123-117.00R.

Sevcon Limited: *See*—
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Seymour, George W. On-line analyzer. 4,042,328, Cl. 23-230.00R.

Shackleford, Edward J.: *See*—
Camacho, Gustavo G.; and Shackleford, Edward J., 4,042,882, Cl. 325-118.000.

Shah, Jashwant C.: *See*—
Sheldon, Loren B.; Tomashek, James R.; Kelly, Robert R.; Thale, James S.; Shah, Jashwant C.; and Ward, Donald H., 4,042,123, Cl. 214-2.500.

Shaler, Amos J.; and McLean, Daniel C. Hair curler with sintered desiccant body. 4,041,961, Cl. 132-40.000.

Shamoon, Ellis. Kitchen cuttingboard. 4,041,964, Cl. 134-115.00R.

Shannon, Robert Day; and Taylor, Barry Edward, to Du Pont de Nemours, E. I., and Company. Substituted lithium orthosilicates and solid electrolytes therefrom. 4,042,482, Cl. 204-242.000.

Sharf, Fridrikh-Leopold Khaskelevich: *See*—
Kazakova, Ljudmila Petrovna; Gundyrev, Alexei Alexandrovich; Rudakova, Nina Yakovlevna; Sharf, Fridrikh-Leopold Khaskelevich; Garun, Yaroslav Evstavievich; Belyashina, Lidia Ivanovna; and Kocheva, Zoya Vasilievna, 4,042,411, Cl. 106-270.000.

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Sharp, Colin Keith: *See*—
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Sharps Associates: *See*—
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Shaw, Wilfrid G.; Terrill, David B.; and Woodbury, David R., to Standard Oil Company, The. Producing unsaturated aliphatic acids. 4,042,533, Cl. 252-437.000.

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Shawn Products Company: *See*—
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Shearon, Michael Hillas, to Du Pont de Nemours, E. I., and Company. Rotary web chopper. 4,041,816, Cl. 83-100.000.
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Harris, Louis Selig; Pars, Harry George; Sheehan, John Clark; and Razdan, Raj Kumar, 4,042,694, Cl. 424-248.550.
Sheldon, Loren B.; Tomashek, James R.; Kelly, Robert R.; Thale, James S.; Shah, Jashwant C.; and Ward, Donald H. Automated pipe handling system. 4,042,123, Cl. 214-2.500.
Shell Oil Company: *See*—
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Barker, Michael D.; Isaac, Eirlys R.; Kirby, Peter; and Smith, Graham C., 4,042,369, Cl. 71-88.000.
Boyer, Alvin Clifford, 4,042,696, Cl. 424-251.000.
Bull, Michael J.; and Searle, Robert J. G., 4,042,710, Cl. 424-304.000.
Harrison, David E. F.; and Doddema, Harmannus J., 4,042,458, Cl. 195-28.00R.
Knapp, Randolph H., 4,042,031, Cl. 166-276.000.
Offeringa, Jan, 4,042,029, Cl. 166-272.000.
Verbrugge, Pieter A.; and Uurbanus, Elisabeth W., 4,042,616, Cl. 260-468.00G.
Sheppard, Chester S.; and MacLeay, Ronald E., to Pennwalt Corporation. Peroxide free radical initiators containing ultraviolet light stabilizing groups. 4,042,773, Cl. 526-208.000.
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Shimauchi, Minoru; and Onoda, Takashi, to Nippon Gakki Seizo Kabushiki Kaisha. System for measuring vibration frequency of vibrating object. 4,041,783, Cl. 73-552.000.
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Shimizu, Takeshi: *See*—
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Shimohata, Takashi: *See*—
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Shinozaki, Takashi; and Asai, Susumu, to Honda Giken Kogyo Kabushiki Kaisha. Parking brake. 4,041,798, Cl. 74-512.000.
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Itatani, Hiroshi; Kashima, Mikito; Shiotani, Akinori; Yoshimoto, Hataaki; and Kato, Tetuo, 4,042,603, Cl. 260-346.20M.
Shipko, Frederick J.: *See*—
Purdy, David L.; Speicher, Vernon L.; Shipko, Frederick J.; and Johnson, William L., 4,041,956, Cl. 128-419.00P.
Shipkov, Nikolai Nikolaevich: *See*—
Chviruk, Vladimir Petrovich; Koneva, Nina Vasilievna; Kilkinov, Alexandr Afanasievich; Demin, Alexandr Viktorovich; Shipkov, Nikolai Nikolaevich; Kosinsky, Konstantin Alexeevich; Kamarian, Georgy Mikirtychevich; Nemirovsky, Ernest Elizarovich; and Samokhin, Igor Nikolaevich, 4,042,656, Cl. 264-29.500.
Shishido, Yoshio, to Toyota Jidosha Kogyo Kabushiki Kaisha. Fastening device for tiltable steering wheel assembly. 4,041,796, Cl. 74-493.000.
Showa Electric Wire & Cable Co. Ltd.: *See*—
Nikaido, Teruji; Haga, Kaoru; and Fujiwara, Yasutaka, 4,042,969, Cl. 361-107.000.
Showa Koji K. K.: *See*—
Murakami, Norio, 4,042,061, Cl. 181-33.0HE.
Shrader, Robert L., to Airco, Inc. Substrate transfer apparatus for a vacuum coating system. 4,042,128, Cl. 214-17.00B.
Shujiro, Shiga; Katsumata, Takeshi; Okamoto, Yasushi; and Nakata, Takashi, to Sumitomo Chemical Company, Limited. Method for the removal of the dusts from combustion exhaust gases. 4,042,352, Cl. 55-98.000.
Shumer, James E. Clamping apparatus. 4,042,264, Cl. 269-88.000.
Shurtleff, George S., to Baker Oil Tools, Inc. Swing chute sampler. 4,041,762, Cl. 73-422.00R.
Si Handling Systems, Inc.: *See*—
Jones, Vercoe C., 4,041,873, Cl. 104-35.000.
Siegel, Israel. Low temperature engine. 4,041,705, Cl. 60-497.000.
Siemens Aktiengesellschaft: *See*—
Dragotinov, Alexander, 4,042,781, Cl. 179-15.0BS.
Engl, Alfred; and Heim, Guenther, 4,042,006, Cl. 164-46.000.
Haas, Ernst; Martin, Joachim; Reuschel, Konrad; and Schnoeller, Manfred, 4,042,454, Cl. 176-10.000.
Hofer, Ernst; and Schlichte, Max, 4,042,893, Cl. 333-28.00R.
Kraus, Hubert, 4,041,587, Cl. 29-25.420.
Lill, Arnulf, 4,042,917, Cl. 340-174.0TF.
Reichenberger, Helmut, 4,041,933, Cl. 128-2.00E.
Seidel, Siegfried, 4,042,897, Cl. 335-245.000.
Seidenbusch, Heinz, 4,042,798, Cl. 200-243.000.
Sieren, Gerald E.; and Musser, Earl C., to Allis-Chalmers Corporation. Four-wheel drive tractor. 4,042,053, Cl. 180-51.000.
Sieverin, Walter J., to American Can Company. Inspection apparatus and method for detecting flaws in serially fed substantially cylindrical objects. 4,042,877, Cl. 324-37.000.
Signetics Corporation: *See*—
Chan, Louis Yc., 4,042,840, Cl. 307-270.000.
Signode Corporation: *See*—
Angarola, Barry R., 4,041,993, Cl. 140-123.600.
Sikes, Wayne Alan, to Electronic Arrays, Inc. Voltage level adaption in MOSFET chips. 4,042,843, Cl. 307-297.000.
Silhol, Louis: *See*—
Laforest, Jean; Silhol, Louis; and Renard, Pierre, 4,042,620, Cl. 260-518.00R.
Simon, Eli. Chromated polyamide resins as curing agents for epoxy resins, and their cured corrosion-resistant reaction products. 4,042,544, Cl. 260-18.0PN.
Simon, Eli. Reactive polyester-amide polymers as co-reactants or curing agents for polyepoxides and polyisocyanates. 4,042,546, Cl. 260-22.00R.
Simon, Heinrich: *See*—
Hellmiss, Otto E.; and Simon, Heinrich, 4,042,082, Cl. 191-12.20A.
Simon, Michael; and Degen, Norbert, to Maschinenfabrik Augsburg-Nurnberg Aktiengesellschaft. Lateral guidance device for wheel sets of rail vehicles. 4,041,877, Cl. 104-242.000.
Simon, Richard M.: *See*—
Hazeltine, Barrett; De Meo, Edgar; and Simon, Richard M., 4,042,491, Cl. 209-74.00R.
Simonet, Guy: *See*—
Baudouin, Yvonne; Simonet, Guy; Eluard, Robert; and Pivard, Claude, 4,042,349, Cl. 55-25.000.
Simplicity Pattern Co. Inc.: *See*—
Blauvelt, Lon; Dickson, J. Douglas; and Russell, Robert C., 4,042,126, Cl. 214-8.50A.
Simprop-Electronic Walter Claas, Firma: *See*—
Meyer, Hans; Kaseberg, Werner; Eisendick, Horst; and Lucke, Willi, 4,042,902, Cl. 338-128.000.
Simpson, Benny E.: *See*—
Nimerick, Kenneth H.; and Simpson, Benny E., 4,042,529, Cl. 252-363.500.
Sioui, Richard H.; and Carver, Edgar B., to Norton Company. Diamond or cubic boron nitride grinding wheel with resin core. 4,042,346, Cl. 51-298.00A.
Sioui, Richard H., to Norton Company. Method of making a resin-metal composite grinding wheel. 4,042,347, Cl. 51-298.00R.
Six, Jean-Claude Gerard: *See*—
Coulmance, Jean-Pierre Rene; and Six, Jean-Claude Gerard, 4,042,875, Cl. 323-75.00N.
Skermetta, Geraldine J., to Skermetta, Inc. Sanitary device for removing animal droppings. 4,042,269, Cl. 294-19.00R.
Skermetta, Inc.: *See*—
Skermetta, Geraldine J., 4,042,269, Cl. 294-19.00R.
SKF Industrial Trading and Development Company B.V.: *See*—
Ernst, Horst M.; Brandenstein, Manfred; and Olschewski, Armin, 4,042,086, Cl. 192-98.000.
SKF Industries, Inc.: *See*—
Asberg, Sture L., 4,042,422, Cl. 148-12.00R.
Skinner, David R.; Sowell, Miles L.; and Justus, Marvin W., to Standard Oil Company (Indiana). Hydraulic control system underflow valve control method and apparatus. 4,042,025, Cl. 166-250.000.
Skinner, Robert Thomas John, to C.A.V. Limited. Fuel injection pumping apparatus. 4,041,920, Cl. 123-139.0AM.
Skubic, Robert P. Jaw tensioning device. 4,041,612, Cl. 33-181.00R.
Skuridin, Vladimir Petrovich: *See*—
Voitovich, Igor Danilovich; Kostyshin, Maxim Timofeevich; Mikhailovskaya, Ekaterina Vasilievna; Petrov, Vyacheslav Vasilievich; Romanenko, Petr Fedorovich; and Skuridin, Vladimir Petrovich, 4,042,450, Cl. 156-652.000.
Slade, Paul G.: *See*—
Wafer, John A.; and Slade, Paul G., 4,042,895, Cl. 335-16.000.
Smeggil, John G., to General Electric Company. Magnetic films of transition metal-rare earth alloys. 4,042,341, Cl. 428-678.000.
Smith, Daniel F. Shelf aid. 4,042,096, Cl. 211-49.00D.
Smith, Derek Reginald, to Union Carbide Corporation. Method of concentric bonding of a rod in a tubular shaft. 4,041,599, Cl. 29-451.000.
Smith, Edwin Studley: *See*—
Glazer, Emmett Jean; and Smith, Edwin Studley, 4,042,637, Cl. 260-652.00P.
Smith, Frank, to Imperial Chemical Industries Limited. Composite conductor. 4,042,753, Cl. 428-651.000.
Smith, Fred T., to Sargent Industries, Inc. Refuse compactor. 4,042,133, Cl. 214-83.300.
Smith, Fred T., to Sargent Industries, Inc. Refuse collection apparatus. 4,042,134, Cl. 214-83.300.
Smith, Frederick W.: *See*—
Seifert, Lester H.; Powers, Raymond P.; Schmidt, William M.; Thorwaldsen, Stanley E.; and Smith, Frederick W., 4,041,679, Cl. 56-11.300.

Smith, Graham C.: *See*—
Barker, Michael D.; Isaac, Eirlys R.; Kirby, Peter; and Smith, Graham C., 4,042,369, Cl. 71-88.000.
Smith, James E.; and Cunningham, James D. Electric impact tool. 4,042,036, Cl. 173-13.000.
Smith, Oak B.: *See*—
Wenger, La Von G.; Osterhaus, Elmer J.; and Smith, Oak B., 4,042,715, Cl. 426-104.000.
Smith, Paul W. Record protector. 4,042,106, Cl. 206-313.000.
Smith, Peter Leslie, to L.M. Ericsson Pty Ltd. Digital encoder/decoder. 4,042,921, Cl. 340-347.0AD.
Smith, Rush B., to Pennsylvania Pacific Corporation. Container for bulk material. 4,042,111, Cl. 206-508.000.
Smith, Walton John. Milk of magnesia. 4,042,685, Cl. 424-158.000.
Smith, Wendell F., Jr.; Eddy, Kenneth L.; and Harnish, Donald P., to Eastman Kodak Company. Photographic dye image stabilization. 4,042,394, Cl. 96-56.000.
Smithers, James P., to Armour and Company. Apparatus for packing strips of material. 4,041,676, Cl. 53-123.000.
Smoot, Joseph. Illuminated curb feeler. 4,042,816, Cl. 240-8.10R.
Snam Progetti S.p.A.: *See*—
Koch, Paolo; and Perrotti, Emilio, 4,042,595, Cl. 260-307.00C.
Marconi, Walter; Oddo, Nicola; and Degen, Ludwig, 4,042,495, Cl. 210-11.000.
Perrotti, Emilio; and Clerici, Mario, 4,042,609, Cl. 260-429.00R.
Snider, Harold H.: *See*—
Snider, John H.; and Snider, Harold H., 4,042,217, Cl. 259-4.0AB.
Snider, John H.; and Snider, Harold H. Lather generator. 4,042,217, Cl. 259-4.0AB.
Snyder, Gene J. Reeled wire holder. 4,042,187, Cl. 242-86.50R.
Snyder, H. Ben, to General Dynamics. Etchant rejuvenation control system. 4,042,444, Cl. 156-345.000.
Sobolewski, Robert: *See*—
Zavaras, Alexander A.; Sobolewski, Robert; and Griffith, Cecil B., 4,042,007, Cl. 164-49.000.
Societa Italiana Telecommunicazioni SIEMENS S.p.A.: *See*—
Rigo, Gualtiero; and Manghi, Carlo Alberto, 4,042,785, Cl. 179-18.0FC.
Societa Italiana Telecomunicazioni SIEMENS, S.p.A.: *See*—
Lupattelli, Carlo; and Miotti, Alfredo, 4,042,784, Cl. 179-18.0EB.
Societe Anonyme Automobiles Citroen: *See*—
Grosseau, Albert, 4,041,924, Cl. 123-193.0CP.
S.A. des Anciens Etablissements Paul Wurth: *See*—
Legille, Edouard; and Mailliet, Pierre, 4,042,130, Cl. 214-35.00R.
Societe Anonyme des Usines Chausson: *See*—
Chartet, Andre, 4,041,594, Cl. 29-157.30C.
Societe Anonyme Secmafer: *See*—
Boyer, Jean Jacques, 4,042,035, Cl. 171-16.000.
Societe de Vente de l'Aluminium: *See*—
Nicoud, Jean-Claude, 4,042,424, Cl. 148-12.70A.
Societe d'Etudes et de Developpement des Aeroglisseurs Marins, Terrestrea et Amphibies S.E.D.A.M.: *See*—
Bertin, Jean Henri; Guienne, Paul; and Lafont, Andre, 4,042,060, Cl. 180-127.000.
Societe Nationale des Petroles d'Aquitaine: *See*—
Gibert, Alain; and Camps, Roger, 4,041,768, Cl. 73-28.000.
Societe Nationale des Poudres et Explosifs: *See*—
Thevenin, Michel J.; Brun, Michel; Boileau, Jacques; and Pegoud, Joseph, 4,041,866, Cl. 102-24.0HC.
Sodeberg, Earl W.: *See*—
Meginnis, George B.; and Sodeberg, Earl W., 4,042,162, Cl. 228-106.000.
Soding TV GmbH & Co. Bild & Ton International: *See*—
Freisleben, Reinhard, 4,042,297, Cl. 353-109.000.
SOFISA (Societe Financiere S.A.): *See*—
Coster, Norbert, 4,042,284, Cl. 308-219.000.
Sokoloski, Martin M., to United States of America, Army. Radiation hardened field effect device. 4,042,946, Cl. 357-25.000.
Sokolov, Uriel S.: *See*—
Cestaro, John P.; Hebbar, Ranna K.; and Sokolov, Uriel S., 4,042,177, Cl. 241-20.000.
Solo Cup Company: *See*—
Gerben, Ralph D., 4,042,148, Cl. 221-222.000.
Solter, Dieter: *See*—
Sabloewski, Horst; Schurbrock, Klaus; and Solter, Dieter, 4,041,764, Cl. 73-425.600.
Sommars, Mark Frederick: *See*—
Goloff, Alexander; and Sommars, Mark Frederick, 4,041,803, Cl. 74-574.000.
Sommerville, Robert E. Planter box. 4,041,643, Cl. 47-66.000.
Sontrix Division of Pittway Corporation: *See*—
Hackett, Kenneth R., 4,042,845, Cl. 310-322.000.
Sony Corporation: *See*—
Kawakami, Hirotake; Takada, Kantaro; and Fukumoto, Toru, 4,042,438, Cl. 156-272.000.
Yamanaka, Seisuke, 4,042,956, Cl. 358-41.000.
Yoshida, Tadao, 4,042,944, Cl. 357-23.000.
Sorgente, Nino: *See*—
Kuettner, Klaus E.; Eisenstein, Reuben; and Sorgente, Nino, 4,042,457, Cl. 195-1.800.
Sotec Corporation: *See*—
Reitz, Norman E., 4,042,447, Cl. 156-610.000.
Soures, Nicholas M.: *See*—
Quinn, H.; and Soures, Nicholas M., 4,042,874, Cl. 323-4.000.
Southwire Company: *See*—
Niehaus, Howard E.; Hass, Winfield M.; Alpha, Homer G.; Hall, Sidney B.; and Traenkner, Frederick O., 4,042,227, Cl. 266-93.000.
Sowell, Miles L.: *See*—
Skinner, David R.; Sowell, Miles L.; and Justus, Marvin W., 4,042,025, Cl. 166-250.000.
Spahrkas, Heinrich: *See*—
Backer, Klaus; Heinze, Helga; Luck, Wolfhard; and Spahrkas, Heinrich, 4,042,321, Cl. 8-94.260.
Spector, Donald. Underwater thermal energy conversion unit. 4,041,707, Cl. 60-641.000.
Spector, Sidney, to Hoffmann-La Roche Inc. Endogenous morphine-like compound. 4,042,682, Cl. 424-95.000.
Speicher, Vernon L.: *See*—
Purdy, David L.; Speicher, Vernon L.; Shipko, Frederick J.; and Johnson, William L., 4,041,956, Cl. 128-419.00P.
Spence-Bate, Harry Arthur Hele. Self-contained single or multiple cassettes and drives. 4,042,300, Cl. 355-73.000.
Spencer, Harvey J., to Paper Converting Machine Company. Method and apparatus for transverse cutting. 4,041,813, Cl. 83-14.000.
Spengler, Ernst M., to Stanztechnik GmbH Roeder & Spengler. Apparatus for separating punched-out workpieces from the surrounding waste material. 4,041,847, Cl. 93-36.00A.
Sperry Rand Corporation: *See*—
Bohman, Carl E.; Durling, Hubert R., Jr.; Susman, Leon; and Rolfe, Norman F., 4,042,132, Cl. 214-42.00A.
Schaffer, Richard Earl; and Rauschelbach, Paul Allen, 4,042,867, Cl. 318-580.000.
Spinks, Ray E.: *See*—
Turner, James Wesley, deceased; and Spinks, Ray E., 4,041,580, Cl. 24-265.0AL.
Sprong, Edmund Jay. Fabric pleater guide including a pleat former. 4,042,155, Cl. 223-34.000.
Stackman, Robert W.: *See*—
Davis, Gerald A.; and Stackman, Robert W., 4,042,618, Cl. 260-470.000.
DeEdwardo, Andrew H.; Zitomer, Fred; Stackman, Robert W.; and Kramer, Charles E., 4,042,561, Cl. 260-45.9NP.
Stackpole Components Company: *See*—
Sykora, Allan J., 4,042,795, Cl. 200-16.00D.
Stadler, Donald: *See*—
Furlette, James L.; and Stadler, Donald, 4,042,104, Cl. 198-774.000.
Staheli, Paul; and Moser, Robert, to Rieter Machine Works, Ltd. Method and apparatus for sensing the thickness of a fiber layer on a moving surface. 4,041,770, Cl. 73-37.500.
Stahlecker, Fritz: *See*—
Stahlecker, Hans, 4,041,688, Cl. 57-104.000.
Stahlecker, Hans, to Stahlecker, Fritz; and Stahlecker, Hans. Bearing means for spinning rotors of an open-end spinning machine. 4,041,688, Cl. 57-104.000.
Stakmore Co., Inc.: *See*—
Schankman, Milton, 4,041,880, Cl. 108-112.000.
Stamicarbon B.V.: *See*—
Wolters, Jan; and Hennekens, Jan L. J. P., 4,042,630, Cl. 260-586.00R.
Standard Alliance Industries, Inc.: *See*—
Duncan, Leroy A.; and Aksamit, Steve M., 4,042,113, Cl. 209-74.00R.
Standard Conveyor Company: *See*—
Krammer, Robert; and McClellan, Michael T., 4,042,101, Cl. 198-460.000.
Standard Oil Company: *See*—
Callahan, James L.; Miller, Arthur F.; and Shaw, Wilfrid G., 4,042,153, Cl. 222-207.000.
Fahrig, Robert J.; and Timm, Terry W., 4,042,489, Cl. 208-152.000.
Greene, Janice L., 4,042,599, Cl. 260-326.5FN.
Shaw, Wilfrid G.; Terrill, David B.; and Woodbury, David R., 4,042,533, Cl. 252-437.000.
Standard Oil Company (Indiana): *See*—
Fields, Ellis K., 4,042,531, Cl. 252-438.000.
Hanson, Robert B.; and Stephens, James R., 4,042,750, Cl. 428-423.000.
Raimondi, Victor V.; Fox, Roy A.; and Piorkowski, Casey E., 4,042,555, Cl. 260-29.6RB.
Skinner, David R.; Sowell, Miles L.; and Justus, Marvin W., 4,042,025, Cl. 166-250.000.
Standard Pressed Steel Co.: *See*—
Clark, Leonard R.; and Meehl, David W., 4,042,097, Cl. 211-182.000.
Ruediger, Frederick, 4,041,600, Cl. 29-513.000.
Stansfield, James Frederick: *See*—
Hauxwell, Frank; Stansfield, James Frederick; and Topham, Arthur, 4,042,413, Cl. 106-308.00N.
Stanton, Stephen: *See*—
Verwey, William G. A.; and Stanton, Stephen, 4,041,853, Cl. 100-4.000.
Stanztechnik GmbH Roeder & Spengler: *See*—
Spengler, Ernst M., 4,041,847, Cl. 93-36.00A.
Starks, Charles M., to Continental Oil Company. Telomers from β-diketones and vinyl chloride. 4,042,631, Cl. 260-593.00H.
Stauffer Chemical Company: *See*—
Arneklev, Duane R.; and Baker, Don R., 4,042,371, Cl. 71-88.000
Kim, Ki Soo, 4,042,542, Cl. 260-6.000.
Magee, Walter L., Jr., 4,042,612, Cl. 260-448.80R.
Stayton, Leroy M.; and Gould, Robert A., to United States of America,

Navy. Shock buffer for liquid propellant gun projectile. 4,041,871, Cl. 102-95.000.

Stearns, Wayne Eugene: *See—*
Fersch, Kenneth Eugene; and Stearns, Wayne Eugene, 4,042,366, Cl. 71-29.000.

Steck, Warren F.: *See—*
Underhill, Edward W.; Chisholm, Melvin D.; Steck, Warren F.; Bailey, Berton K.; Lamb, Peter M.; Struble, Dean L.; and Swailes, G. Edward, 4,042,681, Cl. 424-84.000.

Steele, Edward R., to Tektronix, Inc. Cathode ray storage tube having a target dielectric provided with collector electrode segments extending therethrough. 4,042,390, Cl. 96-36.100.

Steele, William Henry; and Nejtek, George. Carburettors and associated components. 4,041,911, Cl. 123-103.00B.

Steeves, Claire L. Scouring sleeve for use with swimming pool cleaner. 4,041,563, Cl. 15-1.700.

Stehlik, Gerhard: *See—*
Ackermann, Rolf; Morlock, Gerhard; and Stehlik, Gerhard, 4,042,525, Cl. 252-106.000.

Steiger, Anton, to Sulzer Brothers Limited. Hydrostatic piston machine. 4,041,844, Cl. 92-58.000.

Steigerwald, Robert L., to General Electric Company. Chopper ballast for gaseous discharge lamps with auxiliary capacitor energy storage. 4,042,856, Cl. 315-246.000.

Stenberg, Nyyrikki K., to Dart Industries, Inc. Linear response flow meter. 4,041,758, Cl. 73-207.000.

Stendel, Wilhelm: *See—*
Hofer, Wolfgang; Maurer, Fritz; Riebel, Hans-Jochem; and Stendel, Wilhelm, 4,042,690, Cl. 424-200.000.

Stephens, James R.: *See—*
Hanson, Robert B.; and Stephens, James R., 4,042,750, Cl. 428-423.000.

Stepien, George, Jr.; Califano, Frank L., deceased; DeLorenzo, William, Jr., co-executor; Gillard, G. Bruce, co-executor; Russell, Thomas E., deceased; and by Russell, Florence P., executrix, to Flintkote Company, The. Method for reducing water loss through soil by seepage. 4,041,712, Cl. 61-36.00R.

Sterling, Walter S., to Pneumatic Scale Corporation. Air controlled switch. 4,042,099, Cl. 198-393.000.

Sterrett, Charles C.; and Mole, Cecil J., to Westinghouse Electric Corporation. Unitary supporting structure for superconducting field assembly. 4,042,846, Cl. 310-52.000.

Stevens, Arthur William. Visual display board or panel. 4,041,631, Cl. 40-124.200.

Stewart, Donald Ferguson: *See—*
Martin, Anwyn Margaret; Stewart, Donald Ferguson; and Swanson, Andrew Baikie, 4,042,375, Cl. 75-4.000.

Stewart Engineering & Equipment Co.: *See—*
Bowdry, William Perrin, III; and Wickam, Irwin Edward, 4,042,124, Cl. 214-6.0DS.

Stewart, Robert H., to Practical Systems, Inc. Alignment device. 4,041,649, Cl. 51-165.740.

Stokoe, Ridley: *See—*
Pugh, Stuart; and Stokoe, Ridley, 4,042,135, Cl. 214-141.000.

Stone Container Corporation: *See—*
Selin, Howard; and Marker, John R., Jr., 4,042,166, Cl. 229-33.000.

Stone, William Bundy, to Deep Sea Grouting Packers, Inc. Sealing devices. 4,041,718, Cl. 61-86.000.

Stora Kopparbergs Bergslags Aktiebolag: *See—*
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Stork Amsterdam B.V.: *See—*
Santen, Salomon, 4,042,103, Cl. 198-645.000.

Stork Brabant B.V.: *See—*
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Stoyer, Ray L., to Irvine Ranch Water District. Pressure pipe treatment for sewage. 4,042,494, Cl. 210-7.000.

Strandgard, Larry W. Board golf game. 4,042,246, Cl. 273-134.0CG.

Strandly, Ingvald: *See—*
Johansson, Arne Boris; Codorniu, Francisco Lorente; and Strandly, Ingvald, 4,041,989, Cl. 139-425.00A.

Streckert, Ernest H.: *See—*
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Street, Dana C.; and Padgett, Clarence W., to Rockwell International Corporation. MOS inverting power driver circuit. 4,042,838, Cl. 307-270.000.

Strever, Walter: *See—*
Ottmann, Norman; and Strever, Walter, 4,042,315, Cl. 425-392.000.

Strickman, Melvyn B.: *See—*
Strickman, Robert L.; and Strickman, Melvyn B., 4,042,543, Cl. 260-17.40R.

Strickman, Robert L.; and Strickman, Melvyn B. Material for stoppers. 4,042,543, Cl. 260-17.40R.

Stromberg-Carlson Corporation: *See—*
Richards, Glenn L., 4,042,787, Cl. 179-84.0VF.
Richards, Glenn L., 4,042,788, Cl. 179-84.0VF.
Richards, Glenn L., 4,042,789, Cl. 179-84.0VF.
Richards, Glenn L., 4,042,790, Cl. 179-84.0VF.

Strong, Herbert M., to General Electric Company. Novel diamond products and the manufacture thereof. 4,042,673, Cl. 423-446.000.

Struble, Dean L.: *See—*
Underhill, Edward W.; Chisholm, Melvin D.; Steck, Warren F.; Bailey, Berton K.; Lamb, Peter M.; Struble, Dean L.; and Swailes, G. Edward, 4,042,681, Cl. 424-84.000.

Structural Instrumentation, Inc.: *See—*
Reichow, Keith W.; English, David C.; and McCauley, Jerry L., 4,042,049, Cl. 177-137.000.

Strunc, Gerald R.: *See—*
Caulfield, Patrick J.; Diesch, Robert E.; and Strunc, Gerald R., 4,042,973, Cl. 235-150.300.

Strycker, Stanley J., to Dow Chemical Company, The. Substituted phenoxyalkyl quaternary ammonium compounds as antiarrhythemic agents. 4,042,692, Cl. 424-244.000.

Strycker, Stanley J., to Dow Chemical Company, The. Substituted phenoxyalkyl quaternary ammonium compounds as antiarrhythemic agents. 4,042,709, Cl. 424-304.000.

Strycker, Stanley J., to Dow Chemical Company, The. Substituted phenoxyalkyl quaternary ammonium compounds as antiarrhythemic agents. 4,042,712, Cl. 424-329.000.

Stubbs, John K.: *See—*
Acheson, Richard M.; Stubbs, John K.; Baxter, Charles A. R.; and Kuhla, Donald E., 4,042,583, Cl. 542-458.000.

Stunkel, Barry A. Dual-solenoid safety valve. 4,041,842, Cl. 91-448.000.

Sueda, Noriyoshi: *See—*
Kogure, Katsura; Sueda, Noriyoshi; Himoto, Sizuo; Yoshino, Youziro; and Nakagawa, Kunio, 4,042,617, Cl. 260-469.000.

Suggitt, Robert M.; and Gates, Walter C., Jr., to Texaco Inc. Hydrocarbon upgrading process. 4,042,490, Cl. 208-264.000.

Sugihara, Kunihiko; Nakajima, Yasuo; and Hayashi, Yoshimasa, to Nissan Motor Company, Limited. Exhaust gas recirculation system with control apparatus for exhaust gas flow control valve. 4,041,914, Cl. 123-119.00A.

Sugita, Minoru: *See—*
Seguchi, Koji; Sugita, Minoru; Inada, Kazuyoshi; Tagaya, Kiyoshi; and Nakamura, Yuji, 4,042,487, Cl. 208-48.00R.

Sugiyama, Naomasa: *See—*
Terada, Ichiro; Yamada, Tadashi; Nishi, Michio; Uchida, Mitsuo; Sugiyama, Naomasa; Kaneko, Mamoru; and Takeda, Nobuhiko, 4,042,409, Cl. 106-111.000.

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Bucher, Robert, 4,041,987, Cl. 139-59.000.
Grotloh, Karlheinz, 4,041,979, Cl. 137-599.200.
Grotloh, Karlheinz, 4,041,980, Cl. 137-599.200.
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Kitamura, Shuji; Kato, Takashi; and Hirooka, Masaaki, 4,042,648, Cl. 260-896.000.
Shujiro, Shiga; Katsumata, Takeshi; Okamoto, Yasushi; and Nakata, Takashi, 4,042,352, Cl. 55-98.000.
Tatsukami, Yoshiharu; Okada, Mitsuyuki; and Takahashi, Tsutomu, 4,042,766, Cl. 526-47.000.

Sumitomo Electric Industries, Ltd.: *See—*
Ishihara, Yosuke, 4,042,074, Cl. 188-73.300.
Uesugi, Minoru; Ihara, Susumu; and Mizuuchi, Katsumi, 4,041,610, Cl. 33-127.000.

Sumitomo Metal Mining Company Limited: *See—*
Asakawa, Yoshio, 4,042,279, Cl. 299-8.000.

Sun Oil Company: *See—*
Rhodes, Charles F., Jr., 4,042,885, Cl. 330-9.000.

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Schmohe, James S., 4,042,088, Cl. 192-114.00R.

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Weinstein, David H.; Keeney, Joe W.; and Haas, Gregory M., 4,042,758, Cl. 429-111.000.

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Bohman, Carl E.; Durling, Hubert R., Jr.; Susman, Leon; and Rolfe, Norman F., 4,042,132, Cl. 214-42.00A.

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Cole, David F.; and Sutcliffe, Walter, 4,041,555, Cl. 4-10.000.

Suzuki, Yukio, to Toyota Jidosha Kogyo Kabushiki Kaisha. Exhaust gas recirculation system. 4,041,917, Cl. 123-119.00A.

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Schibbye, Hjalmar; and Englund, Arnold, 4,042,310, Cl. 417-310.000.

Swailes, G. Edward: *See—*
Underhill, Edward W.; Chisholm, Melvin D.; Steck, Warren F.; Bailey, Berton K.; Lamb, Peter M.; Struble, Dean L.; and Swailes, G. Edward, 4,042,681, Cl. 424-84.000.

Swanson, Andrew Baikie: *See—*
Martin, Anwyn Margaret; Stewart, Donald Ferguson; and Swanson, Andrew Baikie, 4,042,375, Cl. 75-4.000.

SWECO, Incorporated: *See—*
Huber, Gene A.; and Knartzer, Jon A., 4,042,181, Cl. 241-175.000.

Swihart, Terence J., to Dow Corning Corporation. Enhancing flame retardancy with arylorganobromosilicone compounds. 4,042,563, Cl. 260-45.90K.

Sykora, Allan J., to Stackpole Components Company. Slide switch contact having plural flexible slats providing make before break contact engagement. 4,042,795, Cl. 200-16.00D.

Sylvester, Robert A., to Eastman Kodak Company. Fluid receiving trap with air releasing means comprising a processing composition impervious layer. 4,042,396, Cl. 96-76.00C.

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Wisman, Franklin O., 4,042,965, Cl. 361-29.000.
Tabler, Donald C.: *See*—
Johnson, Marvin M.; and Tabler, Donald C., 4,042,669, Cl. 423-246.000.
Tagaya, Kiyoshi: *See*—
Seguchi, Koji; Sugita, Minoru; Inada, Kazuyoshi; Tagaya, Kiyoshi; and Nakamura, Yuji, 4,042,487, Cl. 208-48.00R.
Taich, Albert; and Gill, Theodore, to Consumer Tire & Supply Co., Inc. Apparatus for locating punctures in tires. 4,041,772, Cl. 73-45.600.
Taira, Kataro: *See*—
Iwamitsu, Yasuyuki; and Taira, Kataro, 4,041,713, Cl. 61-42.000.
Taishin Kohgyo Co., Ltd.: *See*—
Ueno, Eijiro, 4,042,190, Cl. 243-32.000.
Tajima, Akiyoshi, to Osaka Welding Industrial Co., Ltd. Metal spraying apparatus. 4,041,898, Cl. 118-301.000.
Takada, Kantaro: *See*—
Kawakami, Hirotake; Takada, Kantaro; and Fukumoto, Toru, 4,042,438, Cl. 156-272.000.
Takagi, Yukio: *See*—
Hasegawa, Katsuji; Takagi, Yukio; Naito, Sachio; Hiraiwa, Kenichi; and Takasu, Eiji, 4,042,440, Cl. 156-304.000.
Takahashi, Tsutomu: *See*—
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Takeda, Nobuhiko: *See*—
Terada, Ichiro; Yamada, Tadashi; Nishi, Michio; Uchida, Mitsuo; Sugiyama, Naomasa; Kaneko, Mamoru; and Takeda, Nobuhiko, 4,042,409, Cl. 106-111.000.
Takenaka, Shinji: *See*—
Yamamoto, Kousuke; Takenaka, Shinji; and Maeda, Kazuo, 4,042,674, Cl. 423-515.000.
Yamamoto, Kousuke; Takenaka, Shinji; Maeda, Kazuo; and Mituta, Michio, 4,042,675, Cl. 423-515.000.
Takeuchi, Kazuaki, to Chuo Hatsujo Kogyo Co., Ltd. Pipe hanger. 4,042,198, Cl. 248-62.000.
Tamura, Humio: *See*—
Asano, Kiro; Tamura, Humio; Saito, Tsuyoshi; and Kawai, Yoshio, 4,042,486, Cl. 208-44.000.
Tan, Jozef I. Kie Sioe: *See*—
Kelly, Frank L.; and Tan, Jozef I. Kie Sioe, 4,041,955, Cl. 128-419.00P.
Tanaka, Ikuo: *See*—
Misaka, Yasunao; Tanaka, Ikuo; Okada, Hiroo; Goto, Chuichi; Hirota, Moriyuki; Uesugi, Masaaki; and Tsuchiya, Mitsuru, 4,042,500, Cl. 210-189.000.
Tang, Louis S.; Runkle, Dean E.; and Bach, Lloyd G., to Bendix Corporation, The. Accumulator for use in a hydraulic system. 4,041,990, Cl. 138-31.000.
Tanga, Takeshi: *See*—
Amano, Shin; and Tanga, Takeshi, 4,042,908, Cl. 340-46.000.
Tanner, Herbert: *See*—
Bertram, Heidrun; Fahnenstich, Rudolf; Junkermann, Helmut; Pohl, Gerhard; and Tanner, Herbert, 4,042,716, Cl. 426-335.000.
Tarakci, Umit, to Rockwell International Corporation. Photolithographic method of making microcircuits using glycerine in photoresist stripping solution. 4,042,387, Cl. 96-36.000.
Tarasuk, Walter Renald: *See*—
Ip, Anthony Kwok-Chun; Koyanagi, Ken; and Tarasuk, Walter Renald, 4,042,456, Cl. 176-78.000.
Tate & Lyle Limited: *See*—
Lucas, Timothy John, 4,042,538, Cl. 260-17.4SG.
Tatsukami, Yoshiharu; Okada, Mitsuyuki; and Takahashi, Tsutomu, to Sumitomo Chemical Company, Limited. Method for preparation of ionically crosslinked ethylene copolymers. 4,042,766, Cl. 526-47.000.
Taylor, Barry Edward: *See*—
Shannon, Robert Day; and Taylor, Barry Edward, 4,042,482, Cl. 204-242.000.
Taylor, Clarence R. Safety closure for a container and method for opening the closure. 4,042,105, Cl. 206-1.500.
Taylor, Donald R.: *See*—
Curley, John L.; Dawson, C. William; Parmet, Arthur A.; and Taylor, Donald R., 4,042,914, Cl. 354-200.000.
Taylor, George A.: *See*—
Anderberg, Axel W.; and Taylor, George A., 4,042,266, Cl. 292-267.000.
Taylor, Henry F., to United States of America, Navy. Electro-optic binary adder. 4,042,814, Cl. 235-175.000.
Tecumseh Products Company: *See*—
Morse, Robert L.; and Hudson, Sharon J., Jr., 4,041,728, Cl. 62-503.000.
Teijin Limited: *See*—
Kawase, Shoji; Shima, Takeo; and Moriyama, Keiichi, 4,042,571, Cl. 260-78.00R.
Tekken Construction Co. Ltd.: *See*—
Iwamitsu, Yasuyuki; and Taira, Kataro, 4,041,713, Cl. 61-42.000.
Tektronix, Inc.: *See*—
Steele, Edward R., 4,042,390, Cl. 96-36.100.
Teledyne Brown Engineering: *See*—
Rekoff, Michael George, Jr., 4,041,795, Cl. 74-424.80B.
Teledyne, Inc.: *See*—
Baker, William C.; and Chapman, John J., 4,041,757, Cl. 73-202.000.
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Heinonen, Stig Teodor; and Johansson, Gustav Gunnar, 4,042,289, Cl. 339-17.0LC.
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Bellenger, Donald M., 4,042,793, Cl. 179-90.00K.
Tenna Corporation: *See*—
Repay, Laszlo N.; and Young, Thomas A., 4,041,793, Cl. 74-424.80R.
Tensmeyer, Lowell G., to Eli Lilly and Company. Method of killing microorganisms in the inside of a container utilizing a plasma initiated by a focused laser beam and sustained by an electromagnetic field. 4,042,325, Cl. 21-54.00R.
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Inaba, Mitugu; Kouguchi, Noriyuki; Kagawa, Masao; Hosho, Kozo; and Teraoka, Yoshiaki, 4,041,686, Cl. 57-34.00R.
Terlesky, John; Muller, Hugh Emil; Murphy, John C.; and Honath, Harold F., to Pittsburgh-Des Moines Steel Company. Impact resistant tank for cryogenic fluids. 4,041,722, Cl. 62-45.000.
Terrill, David B.: *See*—
Shaw, Wilfrid G.; Terrill, David B.; and Woodbury, David R., 4,042,533, Cl. 252-437.000.
Terry, Morris B. Mechanical aerobic composter. 4,042,219, Cl. 259-88.000.
Teti, John J. Power actuated lazy-tongs arrangement. 4,041,799, Cl. 74-521.000.
Teti, Joseph A., Jr.: *See*—
Breton, Ernest J.; Worden, Dexter; and Pugh, Melville E., Jr., 4,042,747, Cl. 428-323.000.
Teti, William C.: *See*—
Breton, Ernest J.; Worden, Dexter; and Pugh, Melville E., Jr., 4,042,747, Cl. 428-323.000.
Texaco Inc.: *See*—
Allen, Joseph C.; and Woodward, Charles D., 4,042,027, Cl. 166-260.000.
Knifton, John F., 4,042,530, Cl. 252-415.000.
Perciful, Jerry C., 4,042,488, Cl. 208-102.000.
Pitts, Robert W., Jr.; and Whatley, Houston A., Jr., 4,042,824, Cl. 250-263.000.
Suggitt, Robert M.; and Gates, Walter C., Jr., 4,042,490, Cl. 208-264.000.
Texas Instruments Incorporated: *See*—
Chang, Christopher Teh-Min, 4,042,916, Cl. 340-174.0TF.
Ezell, George D., 4,042,906, Cl. 340-15.5TS.
Kilby, Jack S., 4,042,948, Cl. 357-49.000.
Robinson, John Thomas; and Edwards, Richard A., 4,042,951, Cl. 357-67.000.
Textoris, Melvin A.; and Wahl, William, to GF Business Equipment, Inc. Furniture article. 4,041,881, Cl. 108-159.000.
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Brugger, Wilhelm; and Greinacher, Ekkehard, 4,042,672, Cl. 423-419.00R.
Lammerting, Helmut; Langenhagen, Rolf-Dieter; Rossmy, Gerd; and Zaske, Peter, 4,042,540, Cl. 260-2.5AH.
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Sheldon, Loren B.; Tomashek, James R.; Kelly, Robert R.; Thale, James S.; Shah, Jashwant C.; and Ward, Donald H., 4,042,123, Cl. 214-2.500.
Theriault, Maurice N., to Composite Structures Corporation. Racket. 4,042,238, Cl. 273-73.00C.
Thevenin, Michel J.; Brun, Michel; Boileau, Jacques; and Pegoud, Joseph, to Societe Nationale des Poudres et Explosifs; and Etat Francais. Process for the manufacture of a bimetallic facing for hollow charges. 4,041,866, Cl. 102-24.0HC.
Thiele, Gerhard; Zollner, Dieter; and Koziol, Konrad. Metal anode for electro-chemical processes. 4,042,484, Cl. 204-290.00F.
Thoma, Otto: *See*—
Mentrup, Anton; Schromm, Kurt; Thoma, Otto; and Zeile, Karl, 4,042,713, Cl. 424-330.000.
Thomas, Harold A., to General Atomic Company. Electrical cable. 4,042,826, Cl. 250-336.000.
Thomas, Jerald F.: *See*—
Gregory, Charles E.; Brian, Michael; Thomas, Jerald F.; and Cameron, James F., 4,041,554, Cl. 4-10.000.
Thomas, Jerry D.; Hladio, William F.; and Scott, Leo V., to Republic Steel Corporation. Control of inclusion morphology in steel. 4,042,381, Cl. 75-129.000.
Thompson, Donald O.: *See*—
Morris, Winfred L.; and Thompson, Donald O., 4,041,774, Cl. 73-67.900.
Thompson, Stephen E., to McCulloch Corporation. Chain saw with flexible skid and vibration and resonance reducing means. 4,041,606, Cl. 30-381.000.
Thompson, Thomas L. Support structure for a floatable marine dock. 4,041,716, Cl. 61-48.000.

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Seifert, Lester H.; Powers, Raymond P.; Schmidt, William M.; Thorwaldsen, Stanley E.; and Smith, Frederick W., 4,041,679, Cl. 56-11.300.
Thune, Robert H., to General Motors Corporation. Rib trimming of universally molded battery container. 4,041,603, Cl. 29-623.100.
Tibbett, John H.: *See—*
Clinch, Colin W. F.; James, Peter A. R.; and Tibbett, John H., 4,042,267, Cl. 292-318.000.
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Tokai TRW & Co. Ltd.: *See—*
Abe, Michio; and Maeda, Naoyuki, 4,041,922, Cl. 123-191.00S.
Tokuno, Masateru, to Rengo Kabushiki Kaisha. Blank feeding machine. 4,042,234, Cl. 271-151.000.
Tokyo Electric Power Co. Ltd.: *See—*
Nikaido, Teruji; Haga, Kaoru; and Fujiwara, Yasutaka, 4,042,969, Cl. 361-107.000.
Tomashek, James R.: *See—*
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Tomczak, Lawrence William; Crall, Frederick William; Caron, LaVerne Andrew; and Campau, Walter Joseph, to Chrysler Corporation. Vacuum servo actuated variable inductance transducer. 4,042,899, Cl. 336-30.000.
Tomita, Sadami; and Chiba, Akio, to Hitachi, Ltd. Pole piece for use in magnet device and method for manufacturing same. 4,042,898, Cl. 335-297.000.
Tone, Frederick F.; and Borel, Robert J., to Eastman Kodak Company. Integral film unit with intermediate sheet forming a fluid reservoir with one end portion thereof. 4,042,395, Cl. 96-76.00C.
Tooley, Earl C., to Chicago Pneumatic Tool Company. Air pulse noise damper for a pneumatic tool. 4,042,062, Cl. 181-36.00A.
Topchiashvili, Mikhail Izmailovich: *See—*
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Topham, Arthur: *See—*
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Toran, Angel, to Patentes Talgo, S.A. Speed and track curvature suspension control system. 4,041,878, Cl. 105-164.000.
Toray Industries, Inc.: *See—*
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Torres, Anibal, to Pfizer Inc. Polydextrose-based farinaceous compositions. 4,042,714, Cl. 426-62.000.
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Totty, Kenneth D.: *See—*
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Townsend, Todd V.: *See—*
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Miyake, Kenji; Kumon, Hiroshi; Zitukane, Yoshimaru; and Akutagawa, Shigeru, 4,042,385, Cl. 75-224.000.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
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Nohira, Hidetaka, 4,041,913, Cl. 123-119.00A.
Okamoto, Takamitsu, 4,041,700, Cl. 60-278.000.
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Suzuki, Yukio, 4,041,917, Cl. 123-119.00A.
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Tram/Diamond Corporation: *See—*
O'Callaghan, James S., 4,042,201, Cl. 248-309.00R.
Transco Energy Company: *See—*
Cook, Harold L., Jr.; and Geer, Ernest C., 4,042,034, Cl. 166-314.000.
Transports-Recherches-Etudes et Groupement d'Interet Economique (Tregie): *See—*
Michel, Robert, 4,041,876, Cl. 104-130.000.
Trefimetaux: *See—*
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Cain, Earl S.; Carlson, Jerome A.; and Goodrich, George E., 4,042,283, Cl. 308-15.000.
Troncoso, Fernando, Jr.; and Bomar, Scott Lewis. Bowstring release device. 4,041,926, Cl. 124-35.00A.
Trouiller, Jean Claude; and Lafont, Guy, to Schlumberger Technology Corporation. Apparatus for preventing cycle skipping in processing acoustic well-logging signals. 4,042,907, Cl. 340-15.5BH.
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Holland, Warren E.; and True, Martin E., 4,042,033, Cl. 166-310.000.
Trueb, Werner, to Sandoz Ltd. Di-(acyloxyalkyl)-β-haloethane-phosphonates and dithiophosphonates and use as plant growth regulators. 4,042,370, Cl. 71-86.000.
TRW Inc.: *See—*
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Tsao, Utah, to Lummus Company, The. Oxychlorination of hydrocarbons. 4,042,640, Cl. 260-659.00A.
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Tsukasaki, Yasuhiro. Apparatus for folding carton sheet. 4,041,849, Cl. 93-52.000.
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Tsushima, Sakae; Misumi, Teruyuki; and Murakoshi, Masahiko, to Asahi Kasei Kogyo Kabushiki Kaisha. Process for preparing improved cation-exchange membranes. 4,042,496, Cl. 210-23.00R.
Tucky, Jane M., to Lofstedt, Ben E. Toilet roll tissue dispenser. 4,042,159, Cl. 225-15.000.
Tuller, Harold W.; and Nussbaum, Ralph W., to Allied Chemical Corporation. Encapsulant compositions based on anhydride-hardened epoxy resins. 4,042,550, Cl. 260-280.00P.
Tully, William Howard, to Environmental Elements Corporation. Electrostatic precipitator having an improved discharge and collector electrode system and gas distribution means. 4,042,354, Cl. 55-129.000.
Turner, James Wesley, deceased (by Heim, Thomas M., executor); and Spinks, Ray E., to United States of America, Navy. Separable link connector. 4,041,580, Cl. 24-265.0AL.
Tuscarora Cotton Mill: *See—*
Lambert, John Wesley, Jr., 4,041,690, Cl. 57-144.000.
Tyler, Hugh J.: *See—*
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Tyrefors, Lars: *See—*
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UBE Industries, Ltd.: *See—*
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Ueno, Eijiro, to Ueno Kohgyo Ltd.; and Taishin Kohgyo Co., Ltd. Conveyance truck with movable seal plates. 4,042,190, Cl. 243-32.000.
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Ueno, Eijiro, 4,042,190, Cl. 243-32.000.
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Uesugi, Minoru; Ihara, Susumu; and Mizuuchi, Katsumi, to Sumitomo Electric Industries, Ltd. Apparatus for precise measurement of the length of long length materials. 4,041,610, Cl. 33-127.000.
Ugo, John Walter, to Uniroyal, Inc. Apparatus for improving tire uniformity. 4,041,647, Cl. 51-106.00R.
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Underhill, Edward W.; Chisholm, Melvin D.; Steck, Warren F.; Bailey, Berton K.; Lamb, Peter M.; Struble, Dean L.; and Swailes, G. Edward, to Canadian Patents and Development Limited. Composite attractant for Bertha Armyworm moth. 4,042,681, Cl. 424-84.000.
Union Carbide Corporation: *See—*
Acomb, Byron Hillen; and Dolida, Roger Joseph, 4,041,969, Cl. 137-88.000.
Anderson, John Erling, 4,042,345, Cl. 48-209.000.
Jones, Richard Calvin; and Anthes, Clifford Charles, 4,042,225, Cl. 266-75.000.
Kozak, Theodore Frederick, 4,041,949, Cl. 128-287.000.
Matsch, Ladislas Charles; and Drnevich, Raymond Francis, 4,042,493, Cl. 210-6.000.
Molinski, Victor Joseph; and Peacock, Frank Raymond, 4,042,676, Cl. 424-1.000.
Molinski, Victor Joseph; and Wilczewski, Joseph Arthur, 4,042,677, Cl. 424-1.000.
Smith, Derek Reginald, 4,041,599, Cl. 29-451.000.
Van Den Sype, Jaak Stefaan; Kilinskas, William Alphonse; Mazzarella, Richard Benedict; and Lightstone, John Bernard, 4,042,421, Cl. 148-12.00E.

Van den Sype, Jaak Stefaan; Kilinskas, William Alphonse; and Mazzarella, Richard Benedict, 4,042,423, Cl. 148-12.00B.
Union Cooperative Agricole Laitiere de la Manche: *See*—
Eustache, Jean-Marie, 4,042,575, Cl. 260-112.00R.
Eustache, Jean-Marie, 4,042,576, Cl. 260-112.00R.
Union Oil Company of California: *See*—
McArthur, Dennis P., 4,042,532, Cl. 252-466.00J.
Uniroyal, Inc.: *See*—
Cornell, Robert J., 4,042,647, Cl. 260-880.00R.
Larson, Charles E.; and Nojiri, Richard T., 4,042,743, Cl. 428-306.000.
Ugo, John Walter, 4,041,647, Cl. 51-106.00R.
Unit Process Assemblies, Inc.: *See*—
Weinstock, Jacques J., 4,042,880, Cl. 324-64.000.
Unitec, Inc.: *See*—
Webb, William, Jr., 4,042,881, Cl. 324-123.00R.
U.S. Billiards, Inc.: *See*—
Hazeltine, Barrett; De Meo, Edgar; and Simon, Richard M., 4,042,491, Cl. 209-74.00R.
United States of America
Agriculture: *See*—
Palmer, Thomas Y.; and Auvil, Clifford J., 4,041,759, Cl. 73-231.00R.
Army: *See*—
Germanowski, Frank; and Kazura, John A., 4,042,938, Cl. 346-61.000.
Helms, Howard D., 4,042,927, Cl. 343-18.00E.
McCown, Thomas E.; McClymonds, Ken A.; and Halprin, Robert W., 4,041,872, Cl. 102-105.000.
Sokoloski, Martin M., 4,042,946, Cl. 357-25.000.
Energy Research and Development Administration: *See*—
Visioli, Armando J., Jr., 4,042,876, Cl. 324-34.00D.
National Aeronautics and Space Administration: *See*—
Anderson, Roy E.; Brisken, Alex F.; and Lewis, James R., 4,042,926, Cl. 343-17.700.
Coffinberry, George A.; and Kast, Howard B., 4,041,697, Cl. 60-39.28R.
Houseman, John, 4,041,910, Cl. 123-59.0EC.
Navy: *See*—
Atkinson, E. Ronald, 4,042,829, Cl. 250-550.000.
Breslow, B. Arthur, 4,042,432, Cl. 149-89.000.
Cobb, A. Donn, 4,042,904, Cl. 340-6.00R.
Decker, Louise A.; and Langford, Gary O., 4,042,823, Cl. 250-227.000.
Falterman, Charles W.; Griffith, William J.; and Gryting, Harold J., 4,042,430, Cl. 149-19.300.
Fenneman, David B., 4,042,892, Cl. 331-94.50G.
Hunt, Robert E.; and Moore, Kenneth L., 4,042,449, Cl. 156-651.000.
Kellenbenz, Carl W.; Goodman, James P.; and Rector, Randall C., 4,042,830, Cl. 307-40.000.
Lapp, Roger H., 4,042,933, Cl. 343-761.000.
Nyswander, Reuben E., 4,042,837, Cl. 307-265.000.
San Miguel, Anthony, 4,041,869, Cl. 102-56.00R.
Stayton, Leroy M.; and Gould, Robert A., 4,041,871, Cl. 102-95.000.
Taylor, Henry F., 4,042,814, Cl. 235-175.000.
Turner, James Wesley, deceased; and Spinks, Ray E., 4,041,580, Cl. 24-265.0AL.
Wasserman, Bernard; and Kaufman, Martin H., 4,042,441, Cl. 156-306.000.
U.S. Philips Corporation: *See*—
Coulmance, Jean-Pierre Rene; and Six, Jean-Claude Gerard, 4,042,875, Cl. 323-75.00N.
United Technologies Corporation: *See*—
Lewis, George D., 4,041,694, Cl. 60-39.020.
Wooding, Harold C., Jr., 4,042,960, Cl. 358-217.000.
Unitron Corporation: *See*—
Zaderej, George; and Zaderej, Andrew, 4,042,852, Cl. 315-97.000.
Universal Bleacher Company: *See*—
Pari, Vincent Anthony, 4,041,655, Cl. 52-9.000.
Universal Maschinenfabrik Dr. Rudolf Schieber KG: *See*—
Krause, Erich, 4,041,732, Cl. 66-75.200.
University of Leeds Industrial Services Limited: *See*—
Haselden, Geoffrey Gordon; and Handley, Douglas, 4,042,339, Cl. 23-262.000.
Upjohn Company, The: *See*—
Knight, John C.; and Wovcha, Merle G., 4,042,459, Cl. 195-51.00S.
Lin, Chiu-Hong, 4,042,607, Cl. 260-410.90R.
Lin, Chiu-Hong, 4,042,608, Cl. 260-410.90R.
Morozowich, Walter, 4,042,606, Cl. 260-390.000.
Urry, Wilbert Herbert: *See*—
Robertson, Donald Edwin; Urry, Wilbert Herbert, and Kavka, Frank, 4,042,602, Cl. 260-343.410.
Ury, John M., to Wagner Electric Corporation. Service and emergency trailer valve. 4,042,281, Cl. 303-29.000.
Ury, Michael Gerson; Eastlund, Bernard John; Braden, Ray S.; and Wood, Charles H., to Fusion Systems Corporation. Microwave generated radiation apparatus. 4,042,850, Cl. 315-39.000.
Uttech, Raymond, to KARMA division of BRANDT, Inc. Beverage mixing and dispensing machine. 4,042,151, Cl. 222-129.200.
Uurbanus, Elisabeth W.: *See*—
Verbrugge, Pieter A.; and Uurbanus, Elisabeth W., 4,042,616, Cl. 260-468.00G.
Valcour Imprinted Papers, Inc.: *See*—
Collins, Frederick H., 4,042,658, Cl. 264-45.500.
Valleylab, Inc.: *See*—
Morrison, Charles F., Jr.; and Puszman, Alan Z., 4,041,952, Cl. 128-303.130.
Van Dorn Company: *See*—
Henning, George J.; McKinney, Lynn B.; and Scalia, Joseph, 4,042,144, Cl. 220-273.000.
Van Den Sype, Jaak Stefaan; Kilinskas, William Alphonse; Mazzarella, Richard Benedict; and Lightstone, John Bernard, to Union Carbide Corporation. Method for providing strong tough metal alloys. 4,042,421, Cl. 148-12.00E.
Van den Sype, Jaak Stefaan; Kilinskas, William Alphonse; and Mazzarella, Richard Benedict, to Union Carbide Corporation. Method for providing strong wire and strip. 4,042,423, Cl. 148-12.00B.
van der Lely, Cornelis. Rotary harrows with supporting member positioned to protect soil working members. 4,042,038, Cl. 172-59.000.
van der Lely, Cornelis. Rotary harrows. 4,042,039, Cl. 172-59.000.
van der Lely, Cornelis. Cultivators. 4,042,040, Cl. 172-59.000.
van der Lely, Cornelis. Rotary harrows. 4,042,041, Cl. 172-70.000.
van der Lely, Cornelis. Soil cultivating machines. 4,042,042, Cl. 172-91.000.
Van House, Robert M. Archery bow with pivoted bow limbs having rotational synchronizer and adjustable draw force mechanisms. 4,041,927, Cl. 124-61.000.
Vann, Stephen R. Locking device for outboard motor. 4,041,738, Cl. 70-212.000.
Vannice, M. Albert; and Garten, Robert L., to Exxon Research and Engineering Co. Hydrocarbon synthesis from CO and H_2 using Ru supported on a titanium oxide. 4,042,614, Cl. 260-449.00R.
Vannice, M. Albert; and Garten, Robert L., to Exxon Research and Engineering Co. Hydrocarbon synthesis from CO and H_2 using Ni supported on a titanium oxide. 4,042,615, Cl. 260-449.60R.
van Velthoven, Armand J.: *See*—
Koo, Tuh-Kai; and van Velthoven, Armand J., 4,041,896, Cl. 118-48.000.
van Zalm, Fredericus Bastiaan, to B. V. Beverolfabrieken. Anhydrous deep-drawing lubricant. 4,042,515, Cl. 252-56.00R.
Vasiliev, Georgy Konstantinovich: *See*—
Mischenko, Vladimir Petrovich; Oxenenko, Anatoly Yakovlevich; Mischenko, Vladimir Alexandrovich; Vasiliev, Georgy Konstantinovich; Gavrilenko, Jury Alexandrovich; Povelitsa, Vladimir Vasilievich; and Kosenko, Ivan Vasilievich, 4,041,843, Cl. 91-499.000.
Vaughn, Alvie G. Nozzle adapter. 4,042,174. Cl. 239-286.000.
VEB Jenapharm Jena: *See*—
Schmidt, Joachim; Bamberg, Wolfgang; Grunert, Hartmut; Schorm, Erhard; and Weigelt, Christian, 4,042,502, Cl. 210-59.000.
Vedda, Louis: *See*—
Alberny, Robert; and Vedda, Louis, 4,042,008, Cl. 164-147.000.
Veitl, Giswalt, to Vereinigte Osterreichische Eisen- und Stahlwere-Alpine Montan Aktiengesellschaft. Method of producing sheet or plate from rolling stock. 4,041,749, Cl. 72-187.000.
Veltrup, Elmar Michael; and Maasberg, Wolfgang, to Woma-Apparatebau Wolfgang Maasberg & Co. GmbH. Shutoff valve construction particularly for high pressure. 4,042,178, Cl. 251-44.000.
Verbrugge, Pieter A.; and Uurbanus, Elisabeth W., to Shell Oil Company. Preparation of cyclopropanecarboxylates. 4,042,616, Cl. 260-468.00G.
Vereinigte Edelstahlwerke Aktiengesellschaft: *See*—
Rajakovics, Gundolf E., 4,041,709, Cl. 60-655.000.
Vereinigte Flugtechnische Werke-Fokker GmbH: *See*—
Cerne, Gerd, 4,042,193, Cl. 244-129.100.
Vereinigte Osterreichische Eisen- und Stahlwere-Alpine Montan Aktiengesellschaft: *See*—
Veitl, Giswalt, 4,041,749, Cl. 72-187.000.
Verreries Mecaniques Champenoises: *See*—
Champenois, Paul, 4,042,365, Cl. 65-260.000.
Verwey, William G. A.; and Stanton, Stephen, to Precision Industries, Inc. Apparatus for organizing and arranging bundles into stacks. 4,041,853, Cl. 100-4.000.
Vesci, Anthony: *See*—
Perry, Francis James; and Vesci, Anthony, 4,042,937, Cl. 346-1.000.
Vetco Offshore Industries, Inc.: *See*—
Baugh, Benton F., 4,041,719, Cl. 61-110.000.
Victor Company of Japan, Limited: *See*—
Kashiwagi, Shigeru, 4,042,859, Cl. 315-411.000.
Victor F. Weaver, Inc.: *See*—
Martin, Eugene G.; and Risser, Dale M., 4,041,572, Cl. 17-46.000.
Victor, Harvey. Sheetrock hole puncher and nail setter. 4,041,558, Cl. 7-14.10R.
Vidac Corporation: *See*—
Mullen, James W.; McReynolds, Boone K.; and Pace, Herbert D., 4,041,863, Cl. 101-269.000.
Villazon, Francisco, to AMP Incorporated. Hand tool. 4,041,740, Cl. 72-410.000.
Vincent, George E. Quick change snap lock connector. 4,042,305, Cl. 403-14.000.
Vinciguerra, Costantino, to Nuovo Pignone, S.p.A. Device for automatically grasping pieces of fabric. 4,042,271, Cl. 294-61.000.
Visioli, Armando J., Jr., to United States of America, Energy Research and Development Administration. Eddy current gauge for monitoring displacement using printed circuit coil. 4,042,876, Cl. 324-34.00D.
Vitalograph (Ireland) Limited: *See*—
Garbe, Dietmar Rudolf, 4,041,935, Cl. 128-2.080.
Vits, Hilmar, to VITS-Maschinenbau GmbH. Installation for collecting

identically shaped, large and different types of sheets from a plurality of dispensing stations at a collating station. 4,042,233, Cl. 270-58.000.

VITS-Maschinenbau GmbH: *See*—
Vits, Hilmar, 4,042,233, Cl. 270-58.000.

Vock, Manfred Hugo: *See*—
Wilson, Richard A.; Pascale, John V.; and Vock, Manfred Hugo, 4,042,601, Cl. 260-327.00M.

Voda, Gustav: *See*—
Brada, Pavel; Kucera, Jaromir; Chladek, Otokar; Voda, Gustav; Novacek, Jindrich; and Kollmann, Jan, 4,041,733, Cl. 66-138.000.

Vogelsanger, Rolf: *See*—
Rys, Paul; and Vogelsanger, Rolf, 4,042,635, Cl. 260-623.00D.

Voith Getriebe KG: *See*—
Dick, Heinrich; and Kobinger, Erhard, 4,041,809, Cl. 74-866.000.

Voitovich, Igor Danilovich; Kostyshin, Maxim Timofeevich; Mikhailovskaya, Ekaterina Vasilievna; Petrov, Vyacheslav Vasilievich; Romanenko, Petr Fedorovich; and Skuridin, Vladimir Petrovich. Method for the production of films having the desired configuration. 4,042,450, Cl. 156-652.000.

Volk, Heinrich: *See*—
Papenfuhs, Theodor; and Volk, Heinrich, 4,042,611, Cl. 260-439.00R.

Vomish, George W.: *See*—
Chu, Chang K.; Hower, Philip L.; and Vomish, George W., 4,042,947, Cl. 357-34.000.

von Bonin, Wulf; Preis, Lothar; von Gizycki, Ulrich; and Dahm, Manfred, to Bayer Aktiengesellschaft. Filled polymerization products based on carbodiimide copolymers. 4,042,558, Cl. 260-37.00N.

von der Eltz, Hans-Ulrich, to Hoechst Aktiengesellschaft. Process for the continuous wet treatment of textile material in rope form. 4,041,559, Cl. 8-149.100.

von der Heide, Johann, to Papst-Motoren KG. Incrementally controllable motor drive system. 4,042,863, Cl. 318-254.000.

von der Linden, Walter: *See*—
Watermann, Willy; and von der Linden, Walter, 4,041,715, Cl. 61-45.00D.

von Gizycki, Ulrich: *See*—
von Bonin, Wulf; Preis, Lothar; von Gizycki, Ulrich; and Dahm, Manfred, 4,042,558, Cl. 260-37.00N.

Voorhes, William G., to Wanskuck Company. Extrusion process. 4,041,595, Cl. 29-420.000.

Vouthier, Marcel: *See*—
De Araujo, Manuel Alexandre Vincent; and Vouthier, Marcel, 4,042,797, Cl. 200-153.00R.

Vredestein N.V.: *See*—
de Munck, Eduard H. L., 4,041,665, Cl. 52-396.000.

VVB Haushalts- und Verpackungsglas: *See*—
Franke, Johannes; Kessler, Kurt; Muller, Wolfgang; Sauerbier, Heinz; Schneider, Kurt; and Unbehaun, Karl, 4,042,318, Cl. 432-210.000.

W. C. Lamb: *See*—
Hauldren, H. Morris; Claycomb, Jack R.; Chang, Chi-Haung; and DeKerlegand, Deke E., 4,041,773, Cl. 73-67.80S.

W. Schlafhorst & Co.: *See*—
Kamp, Heinz, 4,041,684, Cl. 57-34.00R.

Wachtel, Anselm, to Westinghouse Electric Corporation. Discharge lamp with black light transmitting filter layer. 4,042,849, Cl. 313-489.000.

Wacker-Chemitronic Gesellschaft fur Elektronik-Grundstoffe mbH: *See*—
Heinke, Wolfgang; Kirschner, Helmut; and Reimann, Detlef, 4,042,419, Cl. 148-1.500.
Schmidt, Dietrich; Hofer, Johann; Lang, Winfried; and Bildl, Erich, 4,042,331, Cl. 23-230.0PC.

Wada, Hajime; Kikuchi, Shouji; Hori, Haruo; and Endo, Takaya, to Konishiroku Photo Industry Co., Ltd. Silver halide emulsion containing two equivalent type coupler for use in photography. 4,042,393, Cl. 96-55.000.

Wadensten, Theodore S. Vibratory cleaner for an endless conveyor belt. 4,042,102, Cl. 198-494.000.

Wadkin Limited of Green Lane Works: *See*—
Moorley, George, 4,041,998, Cl. 144-315.00R.

Wafer, John A.; and Slade, Paul G., to Westinghouse Electric Corporation. Combination motor-starter and circuit breaker. 4,042,895, Cl. 335-16.000.

Waggoner, John B., to Caterpillar Tractor Co. Filter arrangement with baffles. 4,042,505, Cl. 210-132.000.

Waggoner, John B.: *See*—
Latimer, Eugene E.; and Waggoner, John B., 4,042,508, Cl. 210-172.000.

Wagner, Adolph A. Cap assembly for a nut and bolt. 4,041,833, Cl. 85-35.000.

Wagner Electric Corporation: *See*—
Atkins, Carl E., 4,042,970, Cl. 361-172.000.
Ury, John M., 4,042,281, Cl. 303-29.000.

Wahl, William: *See*—
Textoris, Melvin A.; and Wahl, William, 4,041,881, Cl. 108-159.000.

Wahle, Gunter; Ludszeweit, Dieter; Gomann, Jurgen; and Zessin, Horst, to Hauni-Werke Korber & Co. KG. Apparatus for producing a continuous tobacco stream. 4,041,958, Cl. 131-84.00B.

Waite, Jerry M.: *See*—
Savins, Joseph George; Burdyn, Ralph F.; and Waite, Jerry M., 4,042,030, Cl. 166-273.000.

Wallace, Bernard E., to B. E. Wallace Products Corporation. Adjustable single-beam gantry. 4,041,875, Cl. 104-126.000.

Wallman, Knut Olof Lennart. Method of making impellers for cross-flow fans. 4,041,593, Cl. 29-156.8CF.

Walter, Forrest L. Balloon with deflation and maneuvering ports. 4,042,192, Cl. 244-99.000.

Walton, Herbert H.: *See*—
Rice, Donald D.; and Walton, Herbert H., 4,041,973, Cl. 137-315.000.

Wanner, Rudolf; and Eckl, Robert, to Fa. Bowe, Bohler & Weber KG Maschinenfabrik. Method of an apparatus for unstacking a pile of sheets. 4,042,235, Cl. 271-94.000.

Wanskuck Company: *See*—
Voorhes, William G., 4,041,595, Cl. 29-420.000.

Ward, Denby Harcourt; and Iley, James Dixon, to Broken Hill Associated Smelters Proprietary Limited, The. Apparatus for debismuthising lead. 4,042,228, Cl. 266-215.000.

Ward, Donald H.: *See*—
Sheldon, Loren B.; Tomashek, James R.; Kelly, Robert R.; Thale, James S.; Shah, Jashwant C.; and Ward, Donald H., 4,042,123, Cl. 214-2.500.

Ward, Donald Leslie, to Wards Construction (Overseas) Ltd. Staircases. 4,041,662, Cl. 52-187.000.

Ward, Eugene T. Vehicle and battery pack. 4,042,054, Cl. 180-60.000.

Ward, Eugene T. Battery powered vehicle and drive system. 4,042,055, Cl. 180-60.000.

Ward, Gerald Frank; and Wray, Gordon Richard, to National Research Development Corporation. Apparatus for inserting seams in base fabric. 4,041,884, Cl. 112-79.00R.

Warda, Richard D.; Buhr, Robert K.; and Rehder, John E., to Canadian Patents and Development Limited. Method and apparatus for filtering through particulate material. 4,042,353, Cl. 55-99.000.

Wards Construction (Overseas) Ltd.: *See*—
Ward, Donald Leslie, 4,041,662, Cl. 52-187.000.

Warkentin, Verona D. Easel. 4,042,203, Cl. 248-449.000.

Warner-Lambert Company: *See*—
Grucza, Bernard J., 4,042,552, Cl. 260-29.6RB.

Warren, Glenn B. Valve arrangements for reciprocating piston machines. 4,041,838, Cl. 91-273.000.

Wasel-Nielen, Horst-Dieter: *See*—
Auel, Theodor; Ulrich, Hannsjorg; Wasel-Nielen, Horst-Dieter; and Heymer, Gero, 4,042,324, Cl. 21-2.70A.

Wasserman, Bernard; and Kaufman, Martin H., to United States of America, Navy. Mechanical-chemical linkage between polymer layers. 4,042,441, Cl. 156-306.000.

Wasson, Burton Kendall; and Weinstock, Leonard M., to Merck Sharp & Dohme (I.A.) Corporation. 2-(3-Substituted amino-2-hydroxypropoxy)-3-substituted pyrazines. 4,042,586, Cl. 544-60.000.

Watanabe, Akinori: *See*—
Ohira, Takeshi; and Watanabe, Akinori, 4,042,069, Cl. 187-29.00R.

Watermann, Willy; and von der Linden, Walter, to Klockner-Werke AG. Pit prop with liftable front end. 4,041,715, Cl. 61-45.00D.

Waters Associates, Inc.: *See*—
Haney, William G.; and Wittmer, Douglas P., 4,042,327, Cl. 23-230.00R.

Waters, Kenneth H., to Continental Oil Company. Air cushion shear wave vibrator. 4,042,063, Cl. 181-119.000.

Watts, Glen A. Weight transfer system for coupling a gang plow to a towing vehicle. 4,042,253, Cl. 280-405.00B.

Watts, Harry, to Dow Chemical Company, The. Expandable polystyrene particles. 4,042,541, Cl. 260-2.50B.

Weant, George E.: *See*—
Natter, Eckard F.; Weant, George E.; and Lobsinger, James R., 4,042,922, Cl. 343-5.00W.

Weatherford Oil Tool Co., Inc.: *See*—
Fox, Roy Kelvin Noel, 4,042,023, Cl. 166-241.000.

Weatherford Oil Tool (U.K.) Limited: *See*—
Wills, Stephen Francis Edmund; and Pledger, Henry Edward, 4,042,022, Cl. 166-241.000.

Weaver, Edward A., to Owens-Illinois, Inc. Ferrimagnetic glass-ceramics. 4,042,519, Cl. 252-62.590.

Webb, William, Jr., to Unitec, Inc. Voltage measuring device having an amplifier in the probe. 4,042,881, Cl. 324-123.00R.

Weeks, Charles B., to Norris Industries, Inc. Trash compactor. 4,041,857, Cl. 100-215.000.

Weeks, Lloyd E.: *See*—
Johnson, John H.; and Weeks, Lloyd E., 4,042,462, Cl. 195-103.50R.

Weemes, Doyle A.: *See*—
Dombroski, John R.; and Weemes, Doyle A., 4,042,442, Cl. 156-310.000.

Weetman, Ronald J.: *See*—
Folmar, Robert G.; and Weetman, Ronald J., 4,041,597, Cl. 29-423.000.

Wegmann, Jacques: *See*—
Becker, Carl; Wegmann, Jacques; and Schaub, Andres, 4,042,320, Cl. 8-39.00C.

Weibel, John, Jr.; and Ferdelman, Donald C., to General Motors Corporation. Room air conditioner with timer. 4,041,723, Cl. 62-126.000.

Weidenbach, James S.: *See*—
Klund, Robert N.; and Weidenbach, James S., 4,042,445, Cl. 156-385.000.

Weidlich, Franz. Induction and exhaust apparatus for piston machines. 4,041,837, Cl. 91-270.000.

Weigelt, Christian: *See*—
Schmidt, Joachim; Bamberg, Wolfgang; Grunert, Hartmut; Schorm, Erhard; and Weigelt, Christian, 4,042,502, Cl. 210-59.000.

Weiland, Edward E. Post hole digger. 4,042,270, Cl. 294-50.800.

Weiler, Raywood C. Wheel and tire carrier for attachment to motor vehicle door. 4,042,157, Cl. 224-42.210.

Weiner, Robert S.: *See—*
Forsgren, Klane F.; Melamed, Sidney; and Weiner, Robert S., 4,042,737, Cl. 428-96.000.

Weinstein, David H.; Keeney, Joe W.; and Haas, Gregory M., to Superior Oil Company, The. Photochemical cell. 4,042,758, Cl. 429-111.000.

Weinstock, Jacques J., to Unit Process Assemblies, Inc. Electrode assembly for measuring the effective thickness of thru-hole plating circuit board workpieces. 4,042,880, Cl. 324-64.000.

Weinstock, Leonard M.: *See—*
Wasson, Burton Kendall; and Weinstock, Leonard M., 4,042,586, Cl. 544-60.000.

Weiskopf, Gunther: *See—*
Chu, Paul; Weiskopf, Gunther; and Saunders, Lawrence J., 4,041,819, Cl. 83-302.000.

Weiss, Steven N.; and Broadwin, Alan, to Cavitron Corporation. Flow control system. 4,041,947, Cl. 128-276.000.

Weissenfels, Franz: *See—*
Bruning, Klaus; Junger, Hans; Pungs, Wolfgang; Rheinfeld, Peter; Weissenfels, Franz; and Wienand, Michael, 4,042,314, Cl. 425-89.000.

Weitz, Hans-Martin; Fischer, Rolf; and Lenke, Dieter, to BASF Aktiengesellschaft. 1,2,4-Dihydrotriazine-4-oxides and a process for their production. 4,042,587, Cl. 544-183.000.

Weitz, Hans-Martin; Fischer, Rolf; and Lenke, Dieter, to BASF Aktiengesellschaft. Manufacture of 1,2,4-dihydrotriazine-4-oxide-spiro-(3,1')-[oximino-(2')-cycloalkanes]. 4,042,588, Cl. 544-183.000.

Welch, James M. Cotton boll gleaner. 4,041,680, Cl. 56-28.000.

Wells Manufacturing Corporation: *See—*
Schimanski, Freddie G., 4,041,601, Cl. 29-568.000.

Wells, Thomas R.; and Jacobs, Donald R., to Bell & Howell Company. Film cartridge. 4,042,296, Cl. 352-78.00R.

Wells, William H.: *See—*
Campbell, Ernest E.; and Wells, William H., 4,042,941, Cl. 254-139.100.

Wellstein, William. Positive seal pitless well adapter. 4,042,020, Cl. 166-85.000.

Wenger, La Von G.; Osterhaus, Elmer J.; and Smith, Oak B., to Wenger Manufacturing. Dense, uniformly layered vegetable protein meat analogue. 4,042,715, Cl. 426-104.000.

Wenger Manufacturing: *See—*
Wenger, La Von G.; Osterhaus, Elmer J.; and Smith, Oak B., 4,042,715, Cl. 426-104.000.

Wentz, John L., to Westinghouse Electric Corporation. Broadband wavelength discriminator. 4,042,302, Cl. 356-74.000.

Wenz, Lothar: *See—*
Decker, Hanns; Pfeiffer, Roland; Wenz, Lothar; and Cordes, Horst, 4,042,492, Cl. 209-223.00R.

Werkzeugmaschinenfabrik Oerlikon-Buhrle AG: *See—*
Ettel, Godwin, 4,041,870, Cl. 102-70.2GA.

Westberg, Erik: *See—*
Sundberg, Erik; and Westberg, Erik, 4,042,436, Cl. 156-182.000.

Western Electric Company, Inc.: *See—*
Bacon, Duane E.; Gattermeir, J. David; Hecox, Spencer S.; and Robb, John J., 4,042,467, Cl. 204-15.000.
Nawracaj, Dennis J., 4,042,724, Cl. 427-9.000.

Westinghouse Air Brake Company: *See—*
Pier, Jerome R., 4,042,081, Cl. 191-8.000.

Westinghouse Electric Corporation: *See—*
Biter, William J., 4,042,418, Cl. 136-89.00P.
Brown, William W., 4,042,455, Cl. 176-37.000.
Chu, Chang K.; Hower, Philip L.; and Vomish, George W., 4,042,947, Cl. 357-34.000.
Fey, Maurice G.; and Wolf, Charles B., 4,042,802, Cl. 219-121.00P.
Freedman, Mark, 4,042,308, Cl. 404-1.000.
Johnson, Steven J., 4,042,813, Cl. 235-151.210.
Lenhoff, John G., Jr., 4,042,831, Cl. 307-88.00R.
Lin, Hung C.; and White, Marvin H., 4,042,945, Cl. 357-23.000.
Lin, Kou Chi; and Dobson, LeRoy E., 4,042,775, Cl. 174-94.00R.
Luo, Fang-Chen; and Brody, Thomas P., 4,042,854, Cl. 315-169.0TV.
Mandel, Alan F., 4,042,067, Cl. 187-29.00R.
Mean, Jean-Marie L.; Kraft, Joseph K.; and Jackson, Leigh F., 4,041,845, Cl. 92-85.00A.
Ostrander, William M.; and Casper, William J., 4,042,068, Cl. 187-29.00R.
Sahasrabudhe, Arun P.; and Matty, Thomas C., 4,042,888, Cl. 330-109.000.
Sterrett, Charles C.; and Mole, Cecil J., 4,042,846, Cl. 310-52.000.
Wachtel, Anselm, 4,042,849, Cl. 313-489.000.
Wafer, John A.; and Slade, Paul G., 4,042,895, Cl. 335-16.000.
Wentz, John L., 4,042,302, Cl. 356-74.000.

Westphal, James A.: *See—*
Fort, J. Robert; Westphal, James A.; and Dix, C. Hewitt, 4,042,905, Cl. 340-15.5DP.

Whatley, Houston A., Jr.: *See—*
Pitts, Robert W., Jr.; and Whatley, Houston A., Jr., 4,042,824, Cl. 250-263.000.

Wheeler, Robert C.: *See—*
Collette, Robert P.; and Wheeler, Robert C., 4,042,858, Cl. 315-379.000.

White, Fred I. Linear force generator and heat engine embodying same. 4,041,706, Cl. 60-527.000.

White, Marvin H.: *See—*
Lin, Hung C.; and White, Marvin H., 4,042,945, Cl. 357-23.000.

White, Richard J.; Lancini, Giancarlo; and Antonini, Piero, to Gruppo Lepetit S.p.A. Rifamycins P, Q and U. 4,042,683, Cl. 424-117.000.

Whitehill, Joseph. Small-motion test device. 4,041,615, Cl. 35-13.000.

Whiteley, Marie Ellen: *See—*
Whiteley, William Bede, 4,042,037, Cl. 172-13.000.

Whiteley, William Bede, to Whiteley, Marie Ellen. Lawn edging device. 4,042,037, Cl. 172-13.000.

Whitman, Robert S. Paper clip construction toy. 4,041,637, Cl. 46-16.000.

Wickam, Irwin Edward: *See—*
Bowdry, William Perrin, III; and Wickam, Irwin Edward, 4,042,124, Cl. 214-6.0DS.

Wicke, Manfred: *See—*
Muller, Ernst-Willi; and Wicke, Manfred, 4,042,768, Cl. 526-65.000.

Widmer, Robert: *See—*
Meinhardt, Norman Anthony; and Widmer, Robert, 4,042,513, Cl. 252-47.500.

Wiegard, Klaus, to Daimler-Benz Aktiengesellschaft. Central mounting of the heat-exchange plate of a regenerative heat-exchanger. 4,042,015, Cl. 165-8.000.

Wienand, Michael: *See—*
Bruning, Klaus; Junger, Hans; Pungs, Wolfgang; Rheinfeld, Peter; Weissenfels, Franz; and Wienand, Michael, 4,042,314, Cl. 425-89.000.

Wiggins, Richard F., to Gyromat Corporation, The. Method for spray coating. 4,042,734, Cl. 427-424.000.

Wilczewski, Joseph Arthur: *See—*
Molinski, Victor Joseph; and Wilczewski, Joseph Arthur, 4,042,677, Cl. 424-1.000.

Wilder, Leslie N.; and Ciaraldi, Anthony, to Dictaphone Corporation. Indexing apparatus for a record and/or playback device. 4,041,890, Cl. 116-114.00R.

Wilkins, Roy A.: *See—*
Rice, Herbert L.; and Wilkins, Roy A., 4,042,666, Cl. 423-167.000.

Williamitis, Victor A., to General Motors Corporation. High pressure shaft seals. 4,042,248, Cl. 277-138.000.

Williams, Jake E.: *See—*
Platt, Louis; Wishman, Marvin; Gentry, David R.; and Williams, Jake E., 4,042,655, Cl. 264-25.000.

Williams, Lewis D.: *See—*
Huber, Wolfgang; Saifer, Mark G.; and Williams, Lewis D., 4,042,689, Cl. 424-177.000.

Williams, Robert F., Jr.: *See—*
Leszyk, Gerald M.; Morrison, Edward D.; and Williams, Robert F., Jr., 4,042,654, Cl. 264-22.000.

Williams, Rodney E., to Moore Business Forms, Inc. High solids content active clay coating formulations and methods for producing and applying the same. 4,042,412, Cl. 106-306.000.

Williamson, Arthur Gerard, to Mazel Holdings Limited. Crushing, material-reducing, grinding and like machines. 4,042,182, Cl. 241-207.000.

Williamson, James A., Jr.: *See—*
Dell, Curtis G.; and Williamson, James A., Jr., 4,042,333, Cl. 23-232.00R.

Williamson, Thomas Donald, to Du Pont de Nemours, E. I., and Company. Loading apparatus for crimper rolls. 4,041,584, Cl. 28-269.000.

Wills, Stephen Francis Edmund; and Pledger, Henry Edward, to Weatherford Oil Tool (U.K.) Limited. Devices for centralizing pipes in borings. 4,042,022, Cl. 166-241.000.

Wilson, Charles G., to Aquashade, Inc. Method for controlling the growth of aquatic plants. 4,042,367, Cl. 71-66.000.

Wilson, Reginald Albert Edward, to Jones & Attwood Limited. Apparatus for removing solid material from sewage or other liquid. 4,042,506, Cl. 210-155.000.

Wilson, Richard A.; Pascale, John V.; and Vock, Manfred Hugo, to International Flavors & Fragrances Inc. Six membered heterocyclic oxathio compounds. 4,042,601, Cl. 260-327.00M.

Wiltshire Cutlery Company Proprietary Ltd.: *See—*
Bayly, Peter Kingsley, 4,041,651, Cl. 51-214.000.

Winkelmann, Erhardt; and Raether, Wolfgang, to Hoechst Aktiengesellschaft. 1-Methyl-2-(phenyl-oxymethyl)-5-nitro-imidazoles and process for their manufacture. 4,042,705, Cl. 424-273.00R.

Winkler, Clifford Wilbur. Molded furniture leg. 4,042,199, Cl. 248-188.800.

Winter, Richard D. Inflatable spherical vehicular device. 4,042,252, Cl. 280-206.000.

Winter, Roland A. E., to Ciba-Geigy Corporation. 1,2-Oxaphospholanes. 4,042,649, Cl. 260-927.00R.

Wintoniw, Helen. Massage apparatus. 4,041,938, Cl. 128-52.000.

Wisconsin Alumni Research Foundation: *See—*
Rasmussen, Don H.; and Loper, Carl R., Jr., 4,042,374, Cl. 75-.50B.

Wiseman, Murriel L., to Wiseman, Murriel L. Stereophonic head rest. 4,042,791, Cl. 179-146.00H.

Wishman, Marvin: *See—*
Platt, Louis; Wishman, Marvin; Gentry, David R.; and Williams, Jake E., 4,042,655, Cl. 264-25.000.

Wisman, Franklin O., to T. B. Wood's Sons Company. Power interruption safeguard apparatus. 4,042,965, Cl. 361-29.000.

Wittke, Eugene O. Method and apparatus for fabricating metal container. 4,041,748, Cl. 72-166.000.

Wittmer, Douglas P.: *See—*
Haney, William G.; and Wittmer, Douglas P., 4,042,327, Cl. 23-230.00R.

Wolf, Charles B.: *See—*
Fey, Maurice G.; and Wolf, Charles B., 4,042,802, Cl. 219-121.00P.
Wolfe, Eugene Earl; and Heath, Allan Burkett, to Acheson Industries, Inc. Reciprocator device. 4,041,899, Cl. 118-323.000.
Wolff, Otto E., to Polaroid Corporation. Method and apparatus for processing vaporous or gaseous fluids. 4,041,708, Cl. 60-649.000.
Wolters, Frederick J., to Johnson Controls, Inc. Multiple message frame adaptor apparatus for loop communication system. 4,042,780, Cl. 179-15.0AL.
Wolters, Jan; and Hennekens, Jan L. J. P., to Stamicarbon B.V. Process for the preparation of cycloalkanones and cycloalkanols. 4,042,630, Cl. 260-586.00R.
Woltersdorf, Harald: *See—*
Buchta, Karl; Abdou, Mohamed; and Woltersdorf, Harald, 4,042,733, Cl. 427-391.000.
Woma-Apparatebau Wolfgang Maasberg & Co. GmbH: *See—*
Veltrup, Elmar Michael; and Maasberg, Wolfgang, 4,042,178, Cl. 251-44.000.
Wong, Andrew: *See—*
Levinson, Leo; and Wong, Andrew, 4,042,091, Cl. 197-138.00R.
Wood, Charles H.: *See—*
Ury, Michael Gerson; Eastlund, Bernard John; Braden, Ray S.; and Wood, Charles H., 4,042,850, Cl. 315-39.000.
Wood, Hamish Christopher Swan; and Ohta, Kyuji, to Burroughs Wellcome Co. Pteridine compounds. 4,042,589, Cl. 260-251.500.
Woodbury, David R.: *See—*
Shaw, Wilfrid G.; Terrill, David B.; and Woodbury, David R., 4,042,533, Cl. 252-437.000.
Wooding, Harold C., Jr., to United Technologies Corporation. Threshold sampling of vidicon camera. 4,042,960, Cl. 358-217.000.
Woodlee, James E.: *See—*
Gaskill, Gerald E.; and Woodlee, James E., 4,042,003, Cl. 152-381.200.
Woodruff, Wilbur John: *See—*
Rayle, Roy E.; Brey, Robert J.; and Woodruff, Wilbur John, 4,041,868, Cl. 102-43.00F.
Woods, Hanbury John, to Gulf Oil Canada Limited. Process for preparing diisopropyl ether. 4,042,633, Cl. 260-614.00R.
Woods, Lee O.; and Frank, James P., to General Electric Company. Combination starter-protector device. 4,042,860, Cl. 361-25.00C.
Woodson, Alfred E.: *See—*
Redmore, Derek; and Woodson, Alfred E., 4,042,323, Cl. 21-2.70A.
Woodward, Charles D.: *See—*
Allen, Joseph C.; and Woodward, Charles D., 4,042,027, Cl. 166-260.000.
Woodward Governor Company: *See—*
Shetler, Terry A., 4,042,809, Cl. 235-150.100.
Worcester, Joseph A. High selectivity radio receiver. 4,042,782, Cl. 179-15.0BT.
Worden, Dexter: *See—*
Breton, Ernest J.; Worden, Dexter; and Pugh, Melville E., Jr., 4,042,747, Cl. 428-323.000.
Wovcha, Merle G.: *See—*
Knight, John C.; and Wovcha, Merle G., 4,042,459, Cl. 195-51.00S.
Wray, Gordon Richard: *See—*
Ward, Gerald Frank; and Wray, Gordon Richard, 4,041,884, Cl. 112-79.00R.
Wu, Leesui: *See—*
Hills, Vernon Elton; and Wu, Leesui, 4,042,841, Cl. 307-272.000.
Wunderlich, Francis J.: *See—*
Evans, Norol T.; and Wunderlich, Francis J., 4,042,924, Cl. 343-7.00A.
Wynn, Gordon Williams. Location apparatus. 4,041,824, Cl. 83-763.000.
Xerox Corporation: *See—*
Hwa, Stephen C. P., 4,042,415, Cl. 134-6.000.
Jones, Lewis O., 4,042,518, Cl. 252-62.600.
Jugle, Don B.; and Lipani, Anthony F., 4,041,902, Cl. 118-653.000.
Levinson, Leo; and Wong, Andrew, 4,042,091, Cl. 197-138.00R.
Lloyd, William A.; Barone, Salvatore; Hooper, Gerald E.; and McFarland, Keith E., 4,042,939, Cl. 346-153.000.
Moriconi, Joseph H.; and Burrows, Louis H., Jr., 4,042,517, Cl. 252-62.10P.
Moser, Rabin, 4,042,804, Cl. 219-216.000.
Quinn, H.; and Soures, Nicholas M., 4,042,874, Cl. 323-4.000.
Yamada, Kantaro: *See—*
Matsuzawa, Hideo; Otani, Masato; Ishii, Hiromichi; Yamada, Kantaro; and Kobayashi, Hasao, 4,042,625, Cl. 260-530.00N.
Yamada, Tadashi: *See—*
Terada, Ichiro; Yamada, Tadashi; Nishi, Michio; Uchida. Mitsuo; Sugiyama, Naomasa; Kaneko, Mamoru; and Takeda, Nobuhiko, 4,042,409, Cl. 106-111.000.
Yamaguchi, Yoshihiro; Shimohata, Takashi; Kaneda, Tsugio; Kita, Sodai; Fuchino, Yoshihide; Kawauchi, Masashi; Furusawa, Sadayashi; and Iwata, Shuzi, to Kobe Steel, Ltd. Grain refined free-machining steel. 4,042,380, Cl. 75-124.000.
Yamaji, Keizo; and Kurahashi, Akira, to Canon Kabushiki Kaisha. Composite information operating method and apparatus. 4,042,962, Cl. 358-300.000.
Yamamoto, Hajime: *See—*
Kano, Tsuyoshi; Nakako, Masaki; Yamamoto, Hajime; and Otomo, Yoshiro, 4,042,527, Cl. 252-301.40H.
Yamamoto, Kousuke; Takenaka, Shinji; and Maeda, Kazuo, to Mitsui Toatsu Chemicals Inc. Process for treating the mother liquor by cooling in the production of anhydrous sodium dithionite. 4,042,674, Cl. 423-515.000.
Yamamoto, Kousuke; Takenaka, Shinji; Maeda, Kazuo; and Mituta, Michio, to Mitsui Toatsu Chemicals, Incorporated. Process for treating the mother liquor by pH adjusting in the production of anhydrous sodium dithionite. 4,042,675, Cl. 423-515.000.
Yamamoto, Yasushi: *See—*
Takamizawa, Minoru; Yamamoto, Yasushi; Inoue, Yoshio; Noshiro, Atsumi; and Fujii, Hitoshi, 4,042,613, Cl. 260-448.20B.
Yamamoto, Yujiro. Ground fault sensor. 4,042,967, Cl. 361-45.000.
Yamanaka, Seisuke, to Sony Corporation. Solid state television camera having a special color filter arrangement. 4,042,956, Cl. 358-41.000.
Yamano, Masaru: *See—*
Yasuoka, Yoshio; Ito, Fumihiko; Tsuboi, Kunitada; Jinno, Kaori; and Yamano, Masaru, 4,042,851, Cl. 315-39.510.
Yamanouchi, Teruo: *See—*
Inoue, Eiichi; Endo, Ichiro; and Yamanouchi, Teruo, 4,042,388, Cl. 96-1.600.
Yamashita, Keitaro: *See—*
Katakura, Hiroshi; and Yamashita, Keitaro, 4,041,903, Cl. 118-658.000.
Yamasita, Nobuo; and Imai, Toshihiro, to Olympus Optical Co., Inc. Retrofocus-type objective for endoscopes. 4,042,295, Cl. 350-202.000.
Yamazaki, Jun'ichiro; Kamo, Takeshi; and Saito, Yoshiichi, to Fujitsu Ltd. Thin film resistor and a method of producing the same. 4,042,479, Cl. 204-192.00F.
Yamazumi, Kaishu: *See—*
Asai, Takeji; and Yamazumi, Kaishu, 4,042,428, Cl. 148-16.500.
Yang, Denis C., to De Laval Separator Company, The. Pneumatic pulsator for teat cups. 4,041,904, Cl. 119-14.410.
Yasuda, Tetuya; Iinuma, Yoshio; and Maekawa, Yuzo, to Citizen Watch Company Limited. Mounting arrangement for an integrated circuit unit in an electronic digital watch. 4,042,861, Cl. 361-400.000.
Yasufuku, Toshio: *See—*
Fujii, Masakatsu; and Yasufuku, Toshio, 4,042,093, Cl. 198-339.000.
Yasuoka, Yoshio; Ito, Fumihiko; Tsuboi, Kunitada; Jinno, Kaori; and Yamano, Masaru, to Sanyo Electric Co., Ltd. Magnetron. 4,042,851, Cl. 315-39.510.
Yensen, William A. Self-aligning blocks. 4,041,660, Cl. 52-100.000.
Yevick, George J., to Personal Communications, Inc. Method of recording image on lenticulated microfiche. 4,042,389, Cl. 96-27.00R.
Yoho, Clayton W.: *See—*
Muhler, Joseph C.; Putt, Mark S.; Kleber, Carl J.; and Yoho, Clayton W., 4,042,680, Cl. 424-55.000.
Yoichi, Inamoto. Device for supporting and guiding knitting needles for knitting machines. 4,041,734, Cl. 66-115.000.
Yokohama Rubber Company Ltd., The: *See—*
Akimoto, Masao, 4,042,230, Cl. 267-136.000.
Yoneya, Kiyoo, to Yoshida Kogyo Kabushiki Kaisha. Carpet construction. 4,042,735, Cl. 428-33.000.
Yonezawa, Keitaro, to Aioi Seiki Kabushiki Kaisha. Pump fluid motor carrying spool valve for distributor valve actuation. 4,042,311, Cl. 417-401.000.
York, Herbert, to Kroy Knitting Developments Ltd.; and B.Y. (Simulated Furs) Limited. Patterning units for circular knitting machines. 4,041,731, Cl. 66-50.00B.
Yoshida, Akihiko: *See—*
Nishino, Atsushi; Yoshida, Akihiko; and Hayakawa, Hayashi, 4,042,420, Cl. 148-6.000.
Yoshida Kogyo K.K.: *See—*
Oda, Kiyoshi, 4,041,578, Cl. 24-205.14R.
Yoshida Kogyo Kabushiki Kaisha: *See—*
Hasegawa, Mutsuo; Aikawa, Kazuo; and Hayashi, Shinji, 4,042,468, Cl. 204-42.000.
Hasegawa, Mutsuo; Imaoka, Toshikazu; and Aikawa, Kazuo, 4,042,469, Cl. 204-42.000.
Hasegawa, Mutsuo; Aikawa, Kazuo; and Nagata, Katsuyuki, 4,042,471, Cl. 204-58.000.
Matsuda, Yoshio, 4,041,577, Cl. 24-205.16C.
Yoneya, Kiyoo, 4,042,735, Cl. 428-33.000.
Yoshida, Tadao, to Sony Corporation. Monostable multivibrator. 4,042,944, Cl. 357-23.000.
Yoshikawa, Akira, to Fuji Xerox Co., Ltd. Electrosensitive recording method. 4,042,936, Cl. 346-1.000.
Yoshimoto, Hataaki: *See—*
Itatani, Hiroshi; Kashima, Mikito; Shiotani, Akinori; Yoshimoto, Hataaki; and Kato, Tetuo, 4,042,603, Cl. 260-346.20M.
Yoshinaga, Mituji, to Central Glass Co., Ltd. Process for the production of hard vinyl chloride foams. 4,042,556, Cl. 260-2.50P.
Yoshino Gypsum Co., Ltd.: *See—*
Terada, Ichiro; Yamada, Tadashi; Nishi, Michio; Uchida, Mitsuo; Sugiyama, Naomasa; Kaneko, Mamoru; and Takeda, Nobuhiko, 4,042,409, Cl. 106-111.000.
Yoshino, Youziro: *See—*
Kogure, Katsura; Sueda, Noriyoshi; Himoto, Sizuo; Yoshino, Youziro; and Nakagawa, Kunio, 4,042,617, Cl. 260-469.000.
Youmans, Donald W., to FMC Corporation. Vehicle wheel suspension with roll freedom. 4,042,260, Cl. 280-721.000.
Young, Bill M.: *See—*
Anderson, Buddy W.; Bowles, Bobby K.; Murphey, Joseph R.; Totty, Kenneth D.; and Young, Bill M., 4,042,032, Cl. '66-276.000.
Young, Robert L.: *See—*
Noll, Dale A.; Piazza, Giacomo J.; and Young, Robert L., 4,041,591, Cl. 29-157.30R.
Young, Thomas A.: *See—*
Repay, Laszlo N.; and Young, Thomas A., 4,041,793, Cl. 74-424.80R.
Zaderej, Andrew: *See—*
Zaderej, George; and Zaderej, Andrew, 4,042,852, Cl. 315-97.000.

Zaderej, George; and Zaderej, Andrew, to Unitron Corporation. Fluorescent lamps with high frequency power supply with inductive coupling and SCR starter. 4,042,852, Cl. 315-97.000.
Zahradnik, Stanislav: *See*—
Resch, Josef; Kadlec, Miloslav; Zahradnik, Stanislav; and Parizek, Josef, 4,041,986, Cl. 139-58.000.
Zappia, Joseph Francis. Treatment of myasthenia gravis and oral medication therefor. 4,042,698, Cl. 424-262.000.
Zarour, Louis Yacoub. Game board with coded dice and game pieces. 4,042,245, Cl. 273-134.0CH.
Zaske, Peter: *See*—
Lammerting, Helmut; Langenhagen, Rolf-Dieter; Rossmy, Gerd; and Zaske, Peter, 4,042,540, Cl. 260-2.5AH.
Zavaras, Alexander A.; Sobolewski, Robert; and Griffith, Cecil B., to Republic Steel Corporation. Continuous casting of metal using electromagnetic stirring. 4,042,007, Cl. 164-49.000.
Zebuhr, William Henry, to Des Champs Laboratories Incorporated. Packaging for heat exchangers. 4,042,018, Cl. 165-166.000.
Zeile, Karl: *See*—
Mentrup, Anton; Schromm, Kurt; Thoma, Otto; and Zeile, Karl, 4,042,713, Cl. 424-330.000.
Zeley, Juan Adalberto, to I.P.U. Limited. Thermal cutting machine for cutting up cast ingots during the operation of continuous casting plant. 4,042,224, Cl. 266-50.000.
Zessin, Horst: *See*—
Wahle, Gunter; Ludszeweit, Dieter; Gomann, Jurgen; and Zessin, Horst, 4,041,958, Cl. 131-84.00B.
Ziccarelli, Salvatore F., to Beatrice Foods Co. Fast conched candy coating. 4,042,721, Cl. 426-613.000.
Zimmermann nee Ignacz, Zsuzsanna; and Gepesz, Robert, to Chinoin Gyogyszer es Vegyeszeti Termekek Gyara RT. Compositions of low calory content. 4,042,719, Cl. 426-573.000.
Zimmermann, Vincenz: *See*—
Paszthory, Emmerich; Hille, Ernst; Seifert, Karl-Gerhard; and Zimmermann, Vincenz, 4,042,622, Cl. 260-562.00K.
Zink Enterprises Security Systems: *See*—
Zink, Henry R., 4,042,796, Cl. 200-61.45R.
Zink, Henry R., to Zink Enterprises Security Systems. Inertia switch for sensing vibration forces. 4,042,796, Cl. 200-61.45R.
Zinser Textilmaschinen GmbH: *See*—
Grau, Gerhard; and Mayer, Otto, 4,041,685, Cl. 57-34.00R.
Zirps, Wilhelm, to Robert Bosch GmbH. Control system. 4,041,840, Cl. 91-416.000.
Zitomer, Fred: *See*—
DeEdwardo, Andrew H.; Zitomer, Fred; Stackman, Robert W.; and Kramer, Charles E., 4,042,561, Cl. 260-45.9NP.
Zitukane, Yoshimaru: *See*—
Miyake, Kenji; Kumon, Hiroshi; Zitukane, Yoshimaru; and Akutagawa, Shigeru, 4,042,385, Cl. 75-224.000.
Zoller, Wilhelm: *See*—
Payer, Wolfgang; Riepe, Volker; and Zoller, Wilhelm, 4,042,767, Cl. 526-64.000.
Zollner, Dieter: *See*—
Thiele, Gerhard; Zollner, Dieter; and Koziol, Konrad, 4,042,484, Cl. 204-290.00F.
Zwald, John Andrew: *See*—
Johnson, Robert Richard; Coons, Robert Arthur; and Zwald, John Andrew, 4,041,766, Cl. 72-402.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 16TH DAY OF AUGUST, 1977

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

American Cyanamid Company: *See*—
Tomcufcik, Andrew Stephen, Re. 29,358, Cl. 542-417.000.

Bennett, John D., to Sun Oil Company (Delaware). System for chipping and moving ice. Re. 29,356, Cl. 299-25.000.

Bequette, Robert J.: *See*—
Mercer, Neil H.; and Bequette, Robert J., Re. 29,359, Cl. 424-253.000.

Bickmore, J. T.; and Goffe, William L., to Xerox Corporation. Image formation and development. Re. 29,357, Cl. 96-1.00R.

Electro-Speed Tool Corporation: *See*—
Malkin, Bruce, Re. 29,354, Cl. 227-132.000.

Goffe, William L.: *See*—
Bickmore, J. T.; and Goffe, William L., Re. 29,357, Cl. 96-1.00R.

Kobayashi, Kazuhiko: *See*—
Saito, Nagao; Kobayashi, Kazuhiko; and Takagi, Shigeru, Re. 29,361, Cl. 219-69.00C.

Lefevre, Andre; and Lefevre, Rosemary Loweth. Board game apparatus. Re. 29,355, Cl. 273-134.0AF.

Lefevre, Rosemary Loweth: *See*—
Lefevre, Andre; and Lefevre, Rosemary Loweth, Re. 29,355, Cl. 273-134.0AF.

Malkin, Bruce, to Electro-Speed Tool Corporation. Electric nailer. Re. 29,354, Cl. 227-132.000.

Mead Johnson & Company: *See*—
Mercer, Neil H.; and Bequette, Robert J., Re. 29,359, Cl. 424-253.000.

Mercer, Neil H.; and Bequette, Robert J., to Mead Johnson & Company. Bronchodilator expectorant composition containing theophylline and a guaiacol. Re. 29,359, Cl. 424-253.000.

Metcalf, John M., to Vought Corporation. Switching system for a transportation system employing a guideway. Re. 29,353, Cl. 104-130.000.

Mitsubishi Denki Kabushiki Kaisha: *See*—
Saito, Nagao; Kobayashi, Kazuhiko; and Takagi, Shigeru, Re. 29,361, Cl. 219-69.00C.

Newton, Richard C., to Phillips Petroleum Company. Non-twisted, heather yarn and method for producing same. Re. 29,352, Cl. 57-140.00R.

Phillips Petroleum Company: *See*—
Newton, Richard C., Re. 29,352, Cl. 57-140.00R.

Saito, Nagao; Kobayashi, Kazuhiko; and Takagi, Shigeru, to Mitsubishi Denki Kabushiki Kaisha. Process for shaping workpiece by electrical discharge and apparatus therefor. Re. 29,361, Cl. 219-69.00C.

Sun Oil Company (Delaware): *See*—
Bennett, John D., Re. 29,356, Cl. 299-25.000.

Takagi, Shigeru: *See*—
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Barrett, Carl Elwood. Carrying case for a tennis racquet or the like. 245,457, 8-16-77, Cl. D87-1.00R.

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18 4,041,683
34 R 4,041,684
4,041,685
4,041,686
56 4,041,687
104 4,041,688
140 J 4,041,689
140 R Re.29,352
144 4,041,690

CLASS 58

23 BA 4,041,691
50 R 4,041,692
116 R 4,041,693

CLASS 60

39.02 4,041,694
4,041,695
39.14 4,041,696
39.28 R 4,041,697
39.52 4,041,698
39.55 4,041,699
278 4,041,700
347 4,041,701
431 4,041,702
464 4,041,703
473 4,041,704
497 4,041,705
527 4,041,706
641 4,041,707
649 4,041,708
655 4,041,709
673 4,041,710

CLASS 61

36 R 4,041,712
42 4,041,713
45 D 4,041,714
4,041,715
48 4,041,716
72.4 4,041,717
86 4,041,718
91 4,041,711
110 4,041,719
4,041,720

CLASS 62

45 4,041,721
4,041,722
126 4,041,723
175 4,041,724
223 4,041,725
238 4,041,726
290 4,041,727
503 4,041,728

CLASS 64

29 4,041,729
30 D 4,041,730

CLASS 65

2 4,042,359
11 W 4,042,360
18 4,042,361
33 4,042,362
60 R 4,042,363
168 4,042,364
260 4,042,365

CLASS 66

50 B 4,041,731
75.2 4,041,732
115 4,041,734
133 4,041,735
138 4,041,733
177 4,041,736

CLASS 68

242 4,041,737

CLASS 70

212 4,041,738
363 4,041,739
417 4,041,741

CLASS 71

29 4,042,366
66 4,042,367
67 4,042,368
86 4,042,370
88 4,042,369
4,042,371
90 4,042,372
91 4,042,373

CLASS 72

38 4,041,742
60 4,041,743
4,041,744
4,041,745
83 4,041,746
105 4,041,747
166 4,041,748
187 4,041,749
4,041,750
199 4,041,751
201 4,041,752
332 4,041,753
353 4,041,755
356 4,041,754
389 4,041,765
402 4,041,766
410 4,041,740

CLASS 73

6 4,041,767
28 4,041,768
32 A 4,041,769
37.5 4,041,770
40.5 R 4,041,771
45.6 4,041,772
67.8 S 4,041,773
67.9 4,041,774
70.2 4,041,775
88 F 4,041,776
118 4,041,777
119 A 4,041,778
144 4,041,779
151 4,041,780
159 4,041,806
194 E 4,041,756
202 4,041,757
207 4,041,758
231 R 4,041,759
379 4,041,760
420 4,041,761
422 R 4,041,762
423 A 4,041,763
425.6 4,041,764
483 4,041,781
493 4,041,782
552 4,041,783

CLASS 74

10.33 4,041,784
11 4,041,785
29 4,041,786
117 4,041,787
217 B 4,041,788
229 4,041,789
258 4,041,790
325 4,041,791
405 4,041,792
424.8 B 4,041,795
424.8 R 4,041,793
460 4,041,794
493 4,041,796
501 R 4,041,797
512 4,041,798
521 4,041,799
571 R 4,041,800
572 4,041,801
573 4,041,802
574 4,041,803
711 4,041,804
740 4,041,805
751 4,041,835
752 C 4,041,807
800 4,041,808
866 4,041,809
868 4,041,810

CLASS 75

4 4,042,375
5 B 4,042,374
26 4,042,376
53 4,042,377
60 4,042,378
88 4,042,379
124 4,042,380
129 4,042,381
170 4,042,382
171 4,042,383
214 4,042,384
224 4,042,385

CLASS 81

52.4 R 4,041,811

CLASS 82

34 R 4,041,812

CLASS 83

14 4,041,813
18 4,041,814
30 4,041,815
100 4,041,816
139 4,041,817
256 4,041,818
302 4,041,819
356.2 4,041,820
382 4,041,821
409.2 4,041,822
478 4,041,823
763 4,041,824

CLASS 84

1.01 4,041,825
4,041,826
225 4,041,829
305 4,041,830
383 R 4,041,827
454 4,041,831
4,041,832
471 R 4,041,828

CLASS 85

35 4,041,833
45 4,041,834

CLASS 91

29 4,041,836
189 R 4,041,839
270 4,041,837
273 4,041,838
416 4,041,840
421 4,041,841
448 4,041,842
499 4,041,843

CLASS 92

58 4,041,844
85 A 4,041,845

CLASS 93

35 PC 4,041,846
35 SB 4,041,851
36 A 4,041,847
36.5 R 4,041,848
52 4,041,849
53 M 4,041,850

CLASS 96

1 R Re.29,357
1.6 4,042,388
27 R 4,042,389
35.1 4,042,386
36 4,042,387
36.1 4,042,390
47 4,042,391
48 PD 4,042,392
55 4,042,393
56 4,042,394
76 C 4,042,395
4,042,396
84 R 4,042,397
85 4,042,398
87 R 4,042,399
124 4,042,400

CLASS 99

403 4,041,852

CLASS 100

4 4,041,853
112 4,041,854
138 4,041,855
214 4,041,856
215 4,041,857
229 A 4,041,858

CLASS 101

111 4,041,859
122 4,041,860
128.4 4,041,861
218 4,041,862
269 4,041,863
350 4,041,864

CLASS 102

20 4,041,865
24 HC 4,041,866
27 R 4,041,867
43 F 4,041,868
56 R 4,041,869
70.2 GA 4,041,870
95 4,041,871
105 4,041,872

CLASS 104

35 4,041,873
38 4,041,874
126 4,041,875
130 Re.29,353
4,041,876
242 4,041,877

CLASS 105

164 4,041,878
366 R 4,041,879

CLASS 106

14.5 4,042,401
15 R 4,042,402
39.7 4,042,403
52 4,042,404
4,042,405
88 4,042,406
90 4,042,407
100 4,042,408
111 4,042,409
117 4,042,410
270 4,042,411
288 Q 4,042,582
306 4,042,412
308 N 4,042,413

CLASS 108

112 4,041,880

159 4,041,881

CLASS 110

7 B 4,041,882

CLASS 112

21 4,041,883
79 R 4,041,884

CLASS 114

126 4,041,885
144 R 4,041,886
230 4,041,887
248 4,041,888

CLASS 115

18 R 4,041,889

CLASS 116

114 R 4,041,890
117 R 4,041,891
119 4,041,892
131 4,041,893

CLASS 118

7 4,041,894
4,041,895
48 4,041,896
300 4,041,897
301 4,041,898
323 4,041,899
419 4,041,900
621 4,041,901
653 4,041,902
658 4,041,903

CLASS 119

14.41 4,041,904
103 4,041,905

CLASS 122

2 4,041,906
479 R 4,041,908
510 4,041,907

CLASS 123

32 SP 4,041,909
59 EC 4,041,910
103 B 4,041,911
117 R 4,041,912
119 A 4,041,913
4,041,914
4,041,915
4,041,916
4,041,917
139 AM 4,041,920
139 AW 4,041,918
139 P 4,041,919
140 R 4,041,921
191 S 4,041,922
4,041,923
193 CP 4,041,924

CLASS 124

35 A 4,041,925
4,041,926
61 4,041,927

CLASS 125

13 SS 4,041,928

CLASS 126

120 4,041,929
121 4,042,160
198 4,041,930

CLASS 127

32 4,042,414

CLASS 128

1 R 4,041,931
2 E 4,041,933
2 F 4,041,934
2 G 4,041,932
2.08 4,041,935
6 4,041,936
15 4,041,937
52 4,041,938
69 4,041,939
80 C 4,041,940
91 A 4,041,941
132 D 4,041,942
145.8 4,041,943
214 B 4,041,944
218 M 4,041,945
260 4,041,946
276 4,041,947
285 4,041,948
287 4,041,949
4,041,950
4,041,951
303.13 4,041,952
419 P 4,041,955
4,041,956
419 PG 4,041,953
419 PT 4,041,954
540 4,041,957

CLASS 131

84 B 4,041,958
4,041,959
173 4,041,960

CLASS 132

40 4,041,961
91 4,041,962

CLASS 134

6 4,042,415
10 4,042,416
104 4,041,963
115 R 4,041,964
167 R 4,041,965

CLASS 135

22 4,041,966

CLASS 136

89 P 4,042,418
89 PC 4,042,417

CLASS 137

39 4,041,967
74 4,041,968
88 4,041,969
102 4,041,970
148 4,041,971
269 4,041,972
315 4,041,973
344 4,041,974
4,041,975
351 4,041,976
494 4,041,977
4,041,978
599.2 4,041,979
4,041,980
604 4,041,981
625.3 4,041,982
625.63 4,041,983
842 4,041,984

CLASS 138

31 4,041,990

CLASS 139

58 4,041,986
59 4,041,987
116 4,041,988
370.2 4,041,985
425 A 4,041,989
449 4,041,991

CLASS 140

123.5 4,041,992
123.6 4,041,993

CLASS 141

1 4,041,994
275 4,041,995

CLASS 144

2 N 4,041,996
136 C 4,041,997
315 R 4,041,998

CLASS 148

1.5 4,042,419
6 4,042,420
12 B 4,042,423
12 E 4,042,421
12 R 4,042,422
12.7 A 4,042,424
13.1 4,042,425
15.5 4,042,427
16.5 4,042,428
31.55 4,042,429

CLASS 149

19.3 4,042,430
36 4,042,431
89 4,042,432

CLASS 150

52 K 4,041,999

CLASS 152

213 A 4,042,000
243 4,042,001
354 4,042,002
381.2 4,042,003

CLASS 156

87 4,042,433
91 4,042,434
121 4,042,435
182 4,042,436
212 4,042,437
272 4,042,438
292 4,042,439
304 4,042,440
306 4,042,441
310 4,042,442
345 4,042,444
349 4,042,443
359 4,042,446
385 4,042,445
610 4,042,447
650 4,042,448
651 4,042,449
652 4,042,450
664 4,042,451

CLASS 160

91 4,042,004
220 4,042,005
263 4,042,028

CLASS 162

60 4,042,452
108 4,042,453

CLASS 164

46 4,042,006
49 4,042,007
147 4,042,008
278 4,042,009
282 4,042,010

CLASS 165

1 4,042,011
4,042,012
2 4,042,013
8 4,042,015
20 4,042,016
63 4,042,017
166 4,042,018

CLASS 166

.5 4,042,014
55 4,042,019
85 4,042,020
4,042,021
241 4,042,022
4,042,023
243 4,042,024
250 4,042,025
258 4,042,026
260 4,042,027
272 4,042,029
273 4,042,030
276 4,042,031
4,042,032
310 4,042,033
314 4,042,034

CLASS 171

16 4,042,035

CLASS 172

13 4,042,037
59 4,042,038
4,042,039
4,042,040
70 4,042,041
91 4,042,042
311 4,042,044
4,042,045

CLASS 173

13 4,042,036
152 4,042,043

CLASS 174

14 R 4,042,774
94 R 4,042,775
110 R 4,042,776

CLASS 175

73 4,042,046
340 4,042,047
380 4,042,048

CLASS 176

10 4,042,454
37 4,042,455
78 4,042,456

CLASS 177

137 4,042,049
198 4,042,050
255 4,042,051

CLASS 179

1 DM 4,042,779
1 E 4,042,778
15 AL 4,042,780
4,042,783
15 BS 4,042,781
15 BT 4,042,782
18 EB 4,042,784
18 FC 4,042,785
79 4,042,777
84 R 4,042,786
84 VF 4,042,787
4,042,788
4,042,789
4,042,790
90 K 4,042,793
90 R 4,042,792
100.4 ST Re.29,360
146 H 4,042,791
175.3 R 4,042,794

CLASS 180

6.7 4,042,052
51 4,042,053
60 4,042,054
4,042,055
65 A 4,042,056
90 4,042,057
98 4,042,058
103 R 4,042,059
127 4,042,060

CLASS 181

33 HE 4,042,061
36 A 4,042,062
119 4,042,063

CLASS 182

115 4,042,064

CLASS 184

1 E 4,042,065

CLASS 187

6 4,042,066
29 R 4,042,067
4,042,068
4,042,069

CLASS 188

1 B 4,042,070
18 A 4,042,071
71.8 4,042,072
72.9 4,042,073
73.3 4,042,074
75 4,042,075
80 4,042,076
171 4,042,077
231 4,042,078
290 4,042,079
361 4,042,080

CLASS 191

8 4,042,081
12.2 A 4,042,082

CLASS 192

3.31 4,042,083
13 R 4,042,084
57 4,042,085
98 4,042,086
99 S 4,042,087
114 R 4,042,088

CLASS 194

102 4,042,089

CLASS 195

1.8 4,042,457
28 R 4,042,458
51 S 4,042,459
65 4,042,460
66 R 4,042,461
103.5 R 4,042,462
120 4,042,463

CLASS 197

102 4,042,090
138 R 4,042,091
171 4,042,092

CLASS 198

339 4,042,093
347 4,042,094
393 4,042,098
4,042,099
446 4,042,100
460 4,042,101
494 4,042,102
645 4,042,103
774 4,042,104

CLASS 200

16 D 4,042,795
61.45 R 4,042,796
153 R 4,042,797
243 4,042,798
288 4,042,799

CLASS 204

1 T 4,042,464
4,042,465
11 4,042,466
15 4,042,467
42 4,042,468
4,042,469
44 4,042,470
58 4,042,471
73 R 4,042,472
109 4,042,473
112 4,042,474
141.5 4,042,475
159.15 4,042,476
181 4,042,478
192 F 4,042,479
224 R 4,042,480
242 4,042,482
270 4,042,481
290 F 4,042,483
4,042,484

CLASS 206

1.5 4,042,105
313 4,042,106
386 4,042,107
392 4,042,108
440 4,042,109
459 4,042,110
508 4,042,111

CLASS 208

11 R 4,042,485
44 4,042,486
48 R 4,042,487
102 4,042,488
152 4,042,489
264 4,042,490

CLASS 209

73 4,042,112
74 R 4,042,113
4,042,491
111.7 R 4,042,114
223 R 4,042,492

CLASS 210

6 4,042,493
7 4,042,494
11 4,042,495
23 R 4,042,496
25 4,042,497
26 4,042,498
31 C 4,042,499
51 4,042,501
59 4,042,502
65 4,042,503
107 4,042,504
132 4,042,505
155 4,042,506
158 4,042,507
172 4,042,508
189 4,042,500
192 4,042,509
220 4,042,510
386 4,042,511
519 4,042,512
616 4,042,634

CLASS 211

49 D 4,042,095
4,042,096
182 4,042,097

CLASS 212

48 4,042,115
140 4,042,116

CLASS 213

50.5 4,042,117

CLASS 214

1 BB 4,042,118
4,042,120
1 CM 4,042,119
4,042,122
1 R 4,042,121
2.5 4,042,123
6 BA 4,042,125
6 DS 4,042,124
8.5 A 4,042,126
10.5 R 4,042,127
17 B 4,042,128
17 DB 4,042,129
35 R 4,042,130
42 A 4,042,132
83.3 4,042,133
4,042,134
138 R 4,042,131
141 4,042,135
146.5 4,042,136
302 4,042,137
314 4,042,138
331 4,042,139
518 4,042,140
766 4,042,141

CLASS 219

69 C Re.29,361
98 4,042,800
121 EB 4,042,801
121 P 4,042,802
211 4,042,803
216 4,042,804
447 4,042,806
492 4,042,805

CLASS 220

4 B 4,042,142
256 4,042,143
273 4,042,144

CLASS 221

94 4,042,145
152 4,042,146
222 4,042,148
225 4,042,147

CLASS 222

40 4,042,149
70 4,042,150
129.2 4,042,151
137 4,042,152
207 4,042,153

CLASS 223

28 4,042,154
34 4,042,155

CLASS 224

5 D 4,042,156
42.21 4,042,157
42.23 4,042,158

CLASS 225

15 4,042,159

CLASS 227

132 Re.29,354

CLASS 228

102 4,042,161
106 4,042,162
198 4,042,163

CLASS 229

23 BT 4,042,164
33 4,042,165
4,042,166
34 HW 4,042,167
40 4,042,168
43 4,042,169
62.5 4,042,170
72 4,042,171

CLASS 233

7 4,042,172

CLASS 235

61.11 R 4,042,807
92 PC 4,042,808
150.1 4,042,809
150.2 4,042,810
150.3 4,042,973
151.11 4,042,812
151.21 4,042,813
151.3 4,042,811
175 4,042,814
194 4,042,815

CLASS 236

49 4,042,173

CLASS 239

286 4,042,174
420 4,042,175

CLASS 240

8.1 R 4,042,816
9 R 4,042,817
41.3 4,042,818
51.11 R 4,042,819
52 R 4,042,820

CLASS 241

20 4,042,177
24 4,042,176
46.11 4,042,179
79 4,042,180
175 4,042,181
207 4,042,182
292.1 4,042,183

CLASS 242

47.5 4,042,184
71.7 4,042,185
84.42 4,042,186
86.5 R 4,042,187
129.51 4,042,188
195 4,042,189

CLASS 243

32 4,042,190

CLASS 244

99 4,042,192
129.1 4,042,193
151 A 4,042,194
155 R 4,042,195
158 4,042,196
183 4,042,197
214 4,042,191

CLASS 248

62 4,042,198
188.8 4,042,199
223.1 4,042,200
309 R 4,042,201
352 4,042,202
449 4,042,203

CLASS 249

57 4,042,204
189 4,042,205
197 4,042,206

CLASS 250

216 4,042,821

4,042,822
227 4,042,823
263 4,042,824
272 4,042,825
336 4,042,826
493 4,042,827
507 4,042,828
550 4,042,829

CLASS 251

44 4,042,178
62 4,042,207

CLASS 252

5 4,042,521
8.05 4,042,522
32.7 HC 4,042,523
47.5 4,042,513
48.6 4,042,514
56 R 4,042,515
62.1 P 4,042,517
62.54 4,042,516
62.59 4,042,519
62.6 4,042,518
69 4,042,524
70 4,042,520
106 4,042,525
300 4,042,526
301.4 H 4,042,527
358 4,042,528
363.5 4,042,529
415 4,042,530
437 4,042,533
438 4,042,531
466 J 4,042,532
511 4,042,534
518 4,042,535

CLASS 254

8 B 4,042,208
21 4,042,209
26 R 4,042,210
57 4,042,211
139.1 4,042,941
164 4,042,212
168 4,042,213
186 R 4,042,214
187.4 4,042,215
190 R 4,042,216

CLASS 259

4 AB 4,042,217
72 4,042,218
88 4,042,219
95 4,042,220
119 4,042,221
176 4,042,222

CLASS 260

2.5 AH 4,042,540
2.5 AK 4,042,536
2.5 AP 4,042,537
2.5 B 4,042,541
2.5 P 4,042,556
6 4,042,542
13 4,042,545
16 4,042,539
17.4 R 4,042,543
17.4 SG 4,042,538
18 PN 4,042,544
22 R 4,042,546
4,042,547
23 XA 4,042,548
4,042,549
28.5 B 4,042,551
29.6 H 4,042,553
29.6 RB 4,042,552
4,042,555
29.7 NR 4,042,554
32.6 NR 4,042,557
37 N 4,042,558
38 4,042,559
42.28 4,042,560
45.8 NT 4,042,562
45.9 K 4,042,563
45.9 NP 4,042,561
47 C 4,042,565
47 EP 4,042,566
47 ET 4,042,564
49 4,042,567
65 4,042,568
75 M 4,042,570
75 T 4,042,569
78 L 4,042,572
78 P 4,042,573
78 R 4,042,571
112 R 4,042,574
4,042,575
4,042,576
153 4,042,577
156 4,042,578
178 4,042,579
207 4,042,580
239.5 4,042,581
251.5 4,042,589
268 R 4,042,590
272 4,042,591
280 P 4,042,550
286 Q 4,042,592
294.8 C 4,042,593
295.5 R 4,042,594
307 C 4,042,595
307R 4,042,596
326.1 4,042,598
326.5 FN 4,042,599
327 M 4,042,601
327 S 4,042,600
343.41 4,042,602
346.2 M 4,042,603
369 4,042,604
378 4,042,605
390 4,042,606
410.9 R 4,042,607
4,042,608
429 R 4,042,609
429.3 4,042,610
439 R 4,042,611
448.2 B 4,042,613
448.8 R 4,042,612
449 R 4,042,614
449.6 R 4,042,615
468 G 4,042,616
469 4,042,617
470 4,042,618
482 P 4,042,619
518 R 4,042,620
530 N 4,042,623
4,042,625
555 A 4,042,626
561 R 4,042,621
562 K 4,042,622
570.6 4,042,624
571 4,042,627
577 4,042,628
583 P 4,042,629
586 R 4,042,630
593 H 4,042,631
607 AL 4,042,632
614 R 4,042,633
623 D 4,042,635
632 A 4,042,636
652 P 4,042,637
653.1 R 4,042,638
656 R 4,042,639
659 A 4,042,640
780 4,042,641
4,042,642
830 P 4,042,645
849 4,042,644
864 4,042,646
880 R 4,042,647
896 4,042,648
924 4,042,650
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	447	245,377	D8—	15	245,392		126	245,406		28	245,433	D25—	1	245,430		15 AJ	245,445
D6—	31	245,378		18	245,393	D11—	144	245,407		73	245,419		16	245,431		15 TT	245,444
	36	245,379		51	245,394		155	245,408	D15—	26	245,420	D26—	18	245,453	D47—	6 D	245,446
	57	245,380		70	245,395	D12—	62	245,409		115	245,421	D28—	46	245,460	D48—	32 A	245,447
	155	245,381		351	245,396		71	245,411	D19—	25	245,422		51	245,459		32 C	245,448
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	149	245,387		98	245,402		217	245,416	D24—	17	245,428		5 H	245,435			245,456
	150	245,388		111	245,403	D13—	1	245,432			245,434		5 JJ	245,440			245,457
	151	245,389		116	245,404		28	245,417		54	245,451		5 KK	245,436		3 A	245,458
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4,042,201
34 : Re.29,358
4,041,558
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35 : 4,041,641
36 : Re.29,357
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37 : 4,041,735
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44 : 4,041,595
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45 : Re.29,352
4,041,584
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47 : 4,041,689
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51 : 4,041,661
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53 : 4,041,621
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54 : 4,041,773
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55 : 4,041,634
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4,042,780

DESIGN PATENTS

1	:	245,456			245,421			245,434	29	:	245,414
		245,457			245,437	20	:	245,394	34	:	245,390
6	:	245,383			245,438	21	:	245,448			245,427
		245,392			245,439	22	:	245,395			245,445
		245,393	12	:	245,401			245,450	36	:	245,377
		245,410			245,420	24	:	245,406			245,380
		245,412			245,424	25	:	245,460			245,386
		245,425	17	:	245,397	26	:	245,409			245,388
		245,442			245,402			245,415			245,389
		245,443			245,407			245,441			245,398
		245,449			245,433			245,444			245,429
8	:	245,399	18	:	245,382	27	:	245,376			245,436

		245,453			245,385						
		245,454			245,387						
37	:	245,379			245,396						
		245,381	48	:	245,404						
		245,416			245,432						
39	:	245,405			245,455						
		245,423	49	:	245,451						
		245,452	53	:	245,426						
42	:	245,417			245,435						
		245,428	55	:	245,391						
44	:	245,384			245,422						

PLANT PATENTS

17	:	4,092	48	:	4,091						

U. S. GOVERNMENT PRINTING OFFICE : O - 1977

U.S. DEPARTMENT OF COMMERCE

Juanita M. Kreps, *Secretary*

PATENT AND TRADEMARK OFFICE

C. Marshall Dann, *Commissioner*